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CONTAMINATION ASSESSMENT REPORT FOR SITE G9 CSS PANAMA CITY FL

12/1/1996

BROWN AND ROOT ENVIRONMENTAL

7113-3.8-56

0014

FILE

Contamination Assessment Report

for

Site G9

Coastal Systems Station

Panama City, Florida

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0008

December 1996

CONTAMINATION ASSESSMENT REPORT
FOR SITE G9

COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Brown & Root Environmental
661 Anderson Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0008

December 1996

PREPARED BY:

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EXECUTIVE SUMMARY
of
CONTAMINATION ASSESSMENT for
Coastal Systems Station Site G9
Panama City, Florida
Facility ID No. 038518667

Brown & Root Environmental (B&R Environmental) has completed a Contamination Assessment (CA) at the above-referenced facility in accordance with the requirements of Chapter 62-770, Florida Administrative Code (FAC). The assessment report was submitted to the Florida Department of Environmental Protection for approval.

B&R Environmental performed the following tasks during the CA:

- Reviewed available Navy documents to identify potential sources and receptors for petroleum hydrocarbons in the vicinity, to evaluate private potable wells in a 0.25-mile radius and public supply water supply wells within 0.50-mile radius, and to locate nearby surface water bodies and to determine surface hydrology and drainage;
- Reviewed Closure Assessment completed for Building G9 to determine boring locations and monitoring well placements;
- Conducted site survey to identify utilities and to construct a site plan;
- Performed excavation of nine soil borings for organic vapor analysis;
- Advanced one shallow permanent monitoring well and three shallow temporary monitoring wells to approximately 15 feet below land surface (bls);
- Collected groundwater samples from the permanent monitoring well for laboratory analysis for Gasoline and Kerosene Analytical Group parameters;
- Collected groundwater samples from the temporary monitoring wells for EPA Method 610 analysis;

The results of the CA revealed no "excessively contaminated" soil at the site, as defined by Chapter 62-770.200 FAC. Laboratory analyses detected EPA Method 418.1 paramters in a groundwater sample slightly above the State Action Level of 5 milligrams per liter (mg/L). All other groundwater parameters tested were reported below State Action Levels. Based on the results of the CA, B&R Environmental proposes the site be granted a **No Further Action** status.

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1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

A Contamination Assessment (CA) was conducted by Brown and Root Environmental (B&R Environmental) for the U.S. Navy (Navy) Southern Division Naval Facilities Engineering Command under Contract Task Order 0008, for the Comprehensive Long-term Environmental Action Navy (CLEAN III), Contract Number N62467-94-D-0888. The CA was conducted at Site G9 located at the Coastal Systems Station (CSS) in Panama City, Florida. The Florida Department of Environmental Protection (FDEP) Facility Identification Number is 038518667.

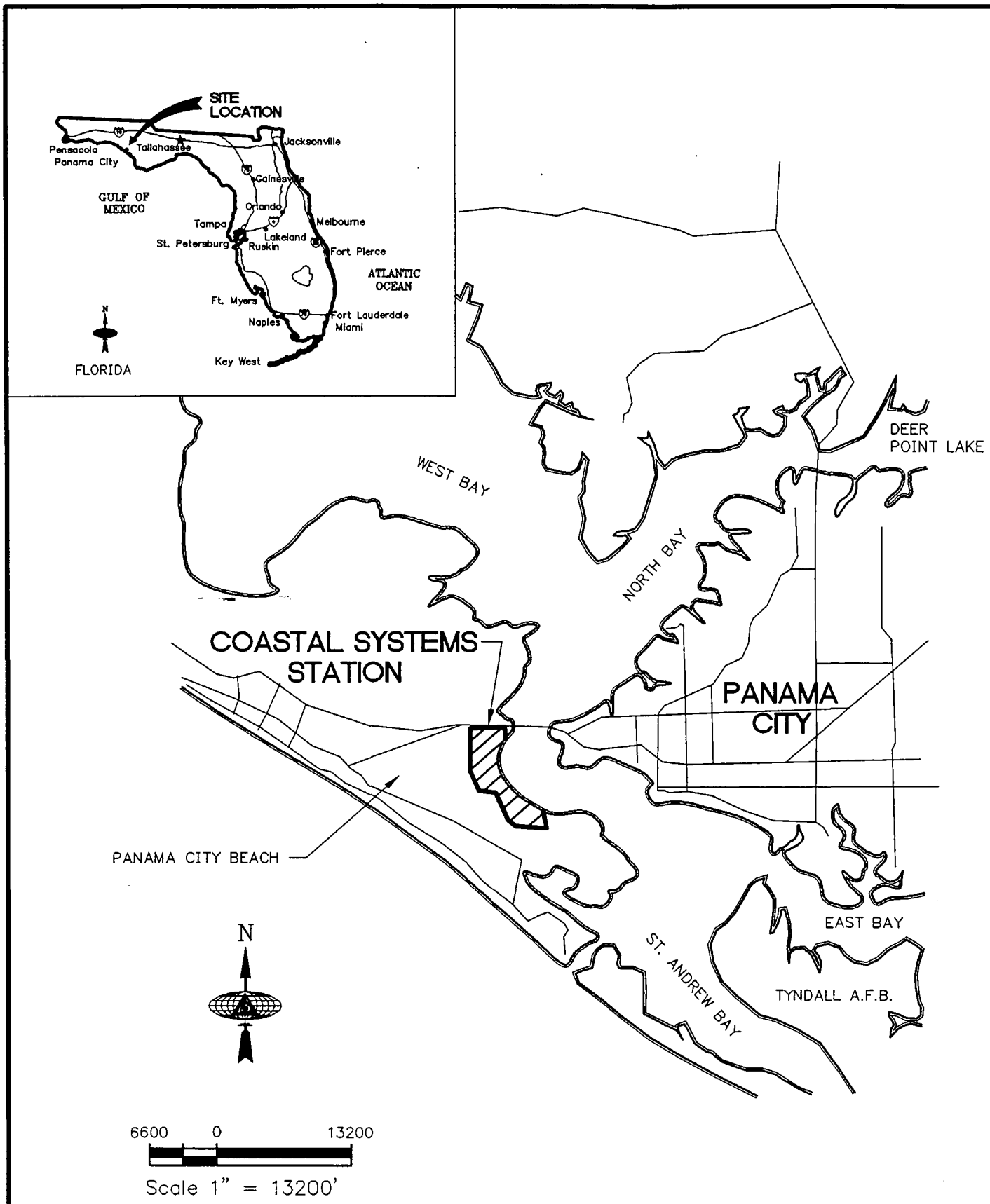
The purpose of this CA was to determine the nature and extent of petroleum hydrocarbon impacted soil and groundwater in accordance with the requirements of Chapter 62-770 of the Florida Administrative Code (FAC). The Navy submitted a Discharge Notification Form (DNF) to the Bay County Health and Rehabilitative Services (HRS), Environmental Health Services Pollution Storage Tank Program on May 20, 1994. The discharge was reported based on groundwater analysis from a temporary well installed during removal of the site's underground storage tank (UST). The DNF listed the type of substance discharged as diesel fuel. The suspected source for the dissolved hydrocarbons was identified on the DNF as being from an adjacent site. The adjacent site previously had an aboveground storage tank which contained diesel fuel. A copy of the DNF report is included as Appendix A.

A CAR Summary Sheet, as required by Chapter 62-770, FAC is included in Appendix B.

1.2 SITE DESCRIPTION

1.2.1 Location

The CSS facility is located on the western shore of St. Andrew Bay in Panama City, Bay County, Florida. The facility is bounded by U.S. Highway 98 to the north, St. Andrew Bay to the east, State Road 292B (Magnolia Beach Road) to the south, and State Road 292 (Thomas Drive) to the west as shown on Figure 1-1. Specifically, the CSS facility is located within Section 33 of Township 3 South, Range 15 West and Section 4 of Township 4 South, Range 15 West, as shown on United States Geological Survey (USGS) Panama City Beach Quadrangle Florida 7.5 Minute Series (Topographic) and presented as Figure 1-2.



MODIFIED RCRA FACILITY INVESTIGATION REPORT

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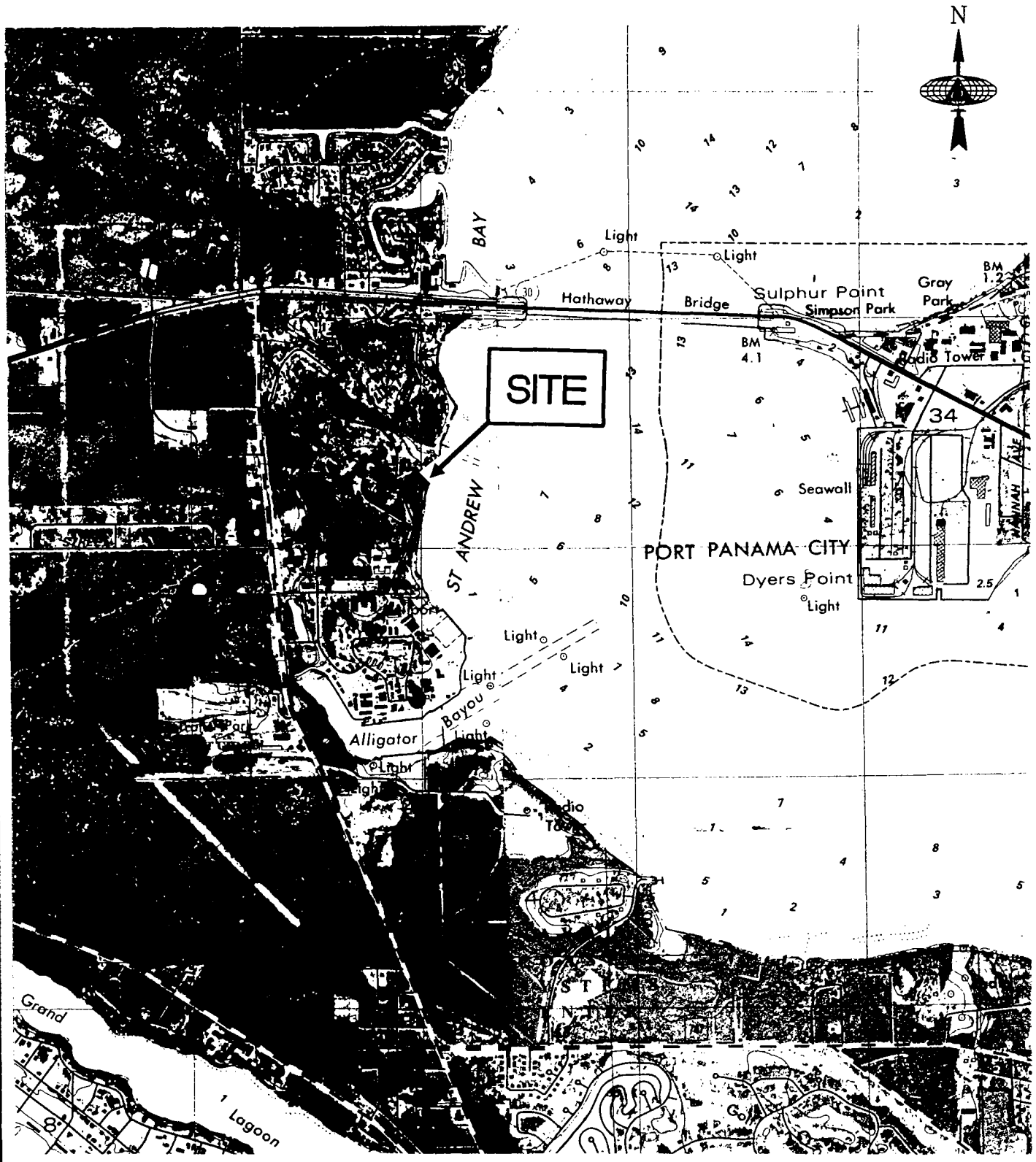
SCALE: 1" = 2.5 MI.	
CAD DWG. NO.: 7113-VM	PROJ. NO.: 7113

Brown & Root Environmental

FIGURE 1-1

SITE VICINITY MAP
SITE G9

COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA



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1000 0 METERS 1000 2000
1 .5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10 000
FEET

SITE MANAGER: GFG	CHECKED BY: WP
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CAD DWG. NO.: 7113-VM	PROJ. NO.: 7113

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FIGURE 1-2

SITE LOCATION

COASTAL SYSTEMS STATION – SITE G9
PANAMA CITY, FLORIDA

1.2.2 Topography and Drainage

The topography at the site gently slopes towards the west. The site is located at an elevation of approximately 10 feet above National Geodetic Vertical Datum (NGVD). The area immediately west of the former diesel underground storage tank (UST) is grassy and would allow surface water to percolate into the subsurface. On-site storm water sheet flow appears to drain toward a storm drain located approximately 70 feet southwest of the site. The nearest surface water body to the site is Alligator Bayou which is located approximately 150 feet south of the former diesel UST. Alligator Bayou is designated as a Class III surface water by the State of Florida, suitable for fish and wildlife propagation and water sports (ABB Environmental Services Inc., RCRA Facility Investigation Report. 1995).

1.2.3 Regional Hydrogeolgy

The regional hydrogeolgy of CSS Panama City is described in the RCRA Facility Investigation Report (ABB Environmental Services, Inc., 1995). According to this report, surficial deposits at CSS are Pleistocene to Recent coastal plain sediments of marine and estuarine origin. They predominately consist of quartz sand, clayey sand, and gravel. These deposits vary in thickness from 70 to 100 feet in Bay County. The surficial aquifer is located within these deposits.

Underlying the surficial deposits is the Intercoastal Formation of middle Miocene to late Pliocene. The Intercoastal Formation is composed of sand and poorly consolidated limestone interbedded with discontinuous clay and low permeability sandy limestone. This formation is approximately 150 feet thick at CSS Panama City. The lower beds of the Intercoastal Formation are part of the Floridan aquifer system.

Groundwater at CSS occurs in two major aquifer systems: unconfined surficial aquifer and the Floridan aquifer system, which is under confined and artesian conditions. A third semi confined aquifer exists in thin permeable sand and shell zones within the Intercoastal Formation, and is separated from the water table aquifer and from the Floridan aquifer system by interbedded low-permeability clay and limestone. The Intercoastal Formation does not produce enough water to be considered a significant water source. The Floridan aquifer is under confined and artesian conditions where low-permeable clays and limestone beds of the Intracoastal Formation separate the water table aquifer from the Floridian aquifer. The surficial aquifer is reported to have insufficient thickness to produce significant quantities of water and its quality is generally undesirable for human use (i.e., dissolved solids, acidity, and iron content). Low permeability clay lenses in the surficial aquifer and the Intercoastal Formation are discontinuous, the surficial aquifer may be hydraulically connected to the Floridan aquifer system through semiconfining

strata of the Intercoastal Formation.

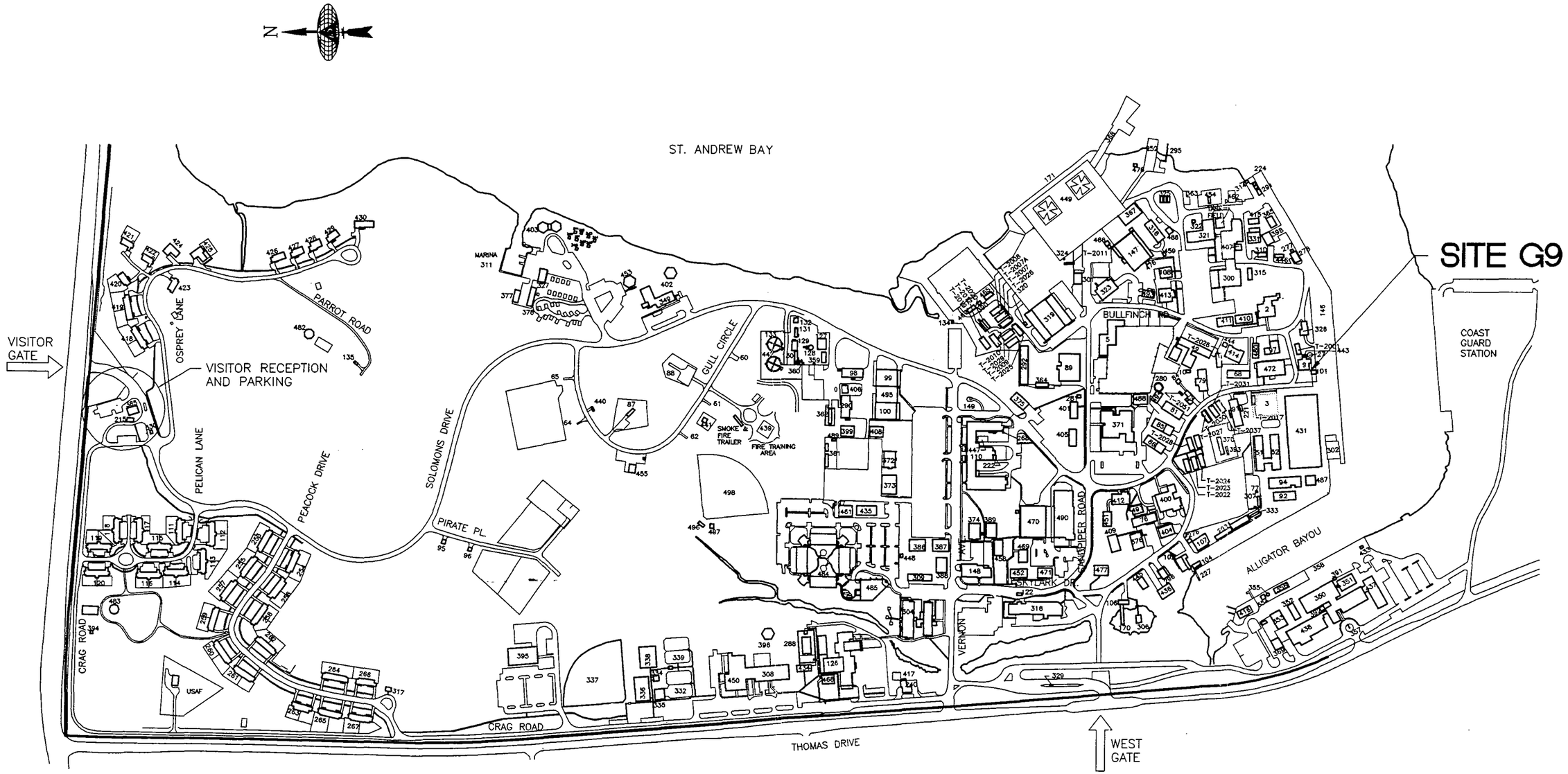
1.2.4 Land Use

Site G9 is located in the southwest area of the CSS property as shown on Figure 1-3. This area of the base is comprised of research facilities and various support activities. In the immediate study area, a 150 gallon gasoline UST was located at the southwest corner of Building 101 which borders the site to the south. A 10,000 gallon aboveground diesel storage tank was located approximately 70 feet east of Building G9. Both the 150 gallon gasoline UST and the 10,000 gallon aboveground diesel storage tank have been deactivated and removed.

1.2.5 Site Description

Site G9 contained one 1,200-gallon steel (UST) which contained diesel fuel. The UST was used to store diesel fuel which supplied a generator located in Building 9. The UST tank and product lines were removed in March 1994. The systems product lines were cut, capped, and abandoned in place, where lines entered beneath structures. A site plan is shown as Figure 1-4.

The diesel UST was supplied fuel from an aboveground 10,000 gallon diesel tank located approximately 70 feet southeast of the diesel UST. The aboveground diesel tank has since been removed and the assessment of the aboveground tank and fuel line are being addressed as part of the Installation Restoration Program Assessments being conducted at the Navy Base (Clayton, November 28, 1995). The close proximity of the aboveground diesel tank and associated fuel line is a potential source for diesel constituents at the site.



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SCALE: 1" = 500'	
CAD DWG. NO.: G9–BASE	PROJ. NO.: 7113

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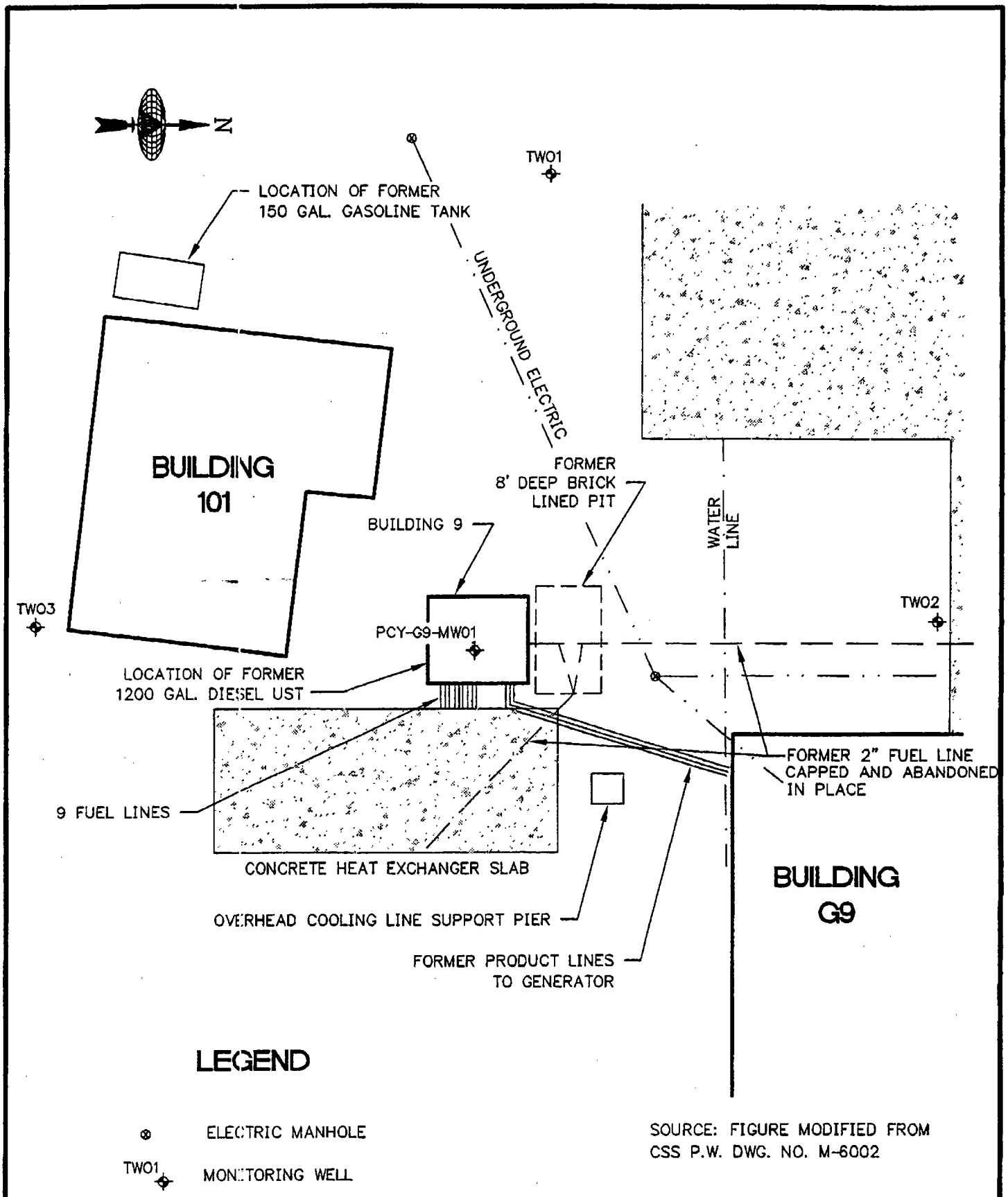
FIGURE 1–3
NAVAL FACILITY SITE LOCATION
SITE G9
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA



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SCALE: 1" =8'	
CAD DWG. NO.: 7113-G9	PROJ. NO.: 7113

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FIGURE 1-4
SITE PLAN
SITE G9
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

1.2.6 Potable Water Well Survey

The potable water supply information presented in this report was obtained from the Resource Conservation and Recovery Act (RCRA) Facility Investigation completed for CSS (ABB Environmental Services Inc., 1995). According to this report, potable water for most of Panama City and Panama City Beach, including CSS, is supplied by surface water. Panama City Beach also uses groundwater from the Floridan aquifer system, as do private and domestic water systems throughout Bay County.

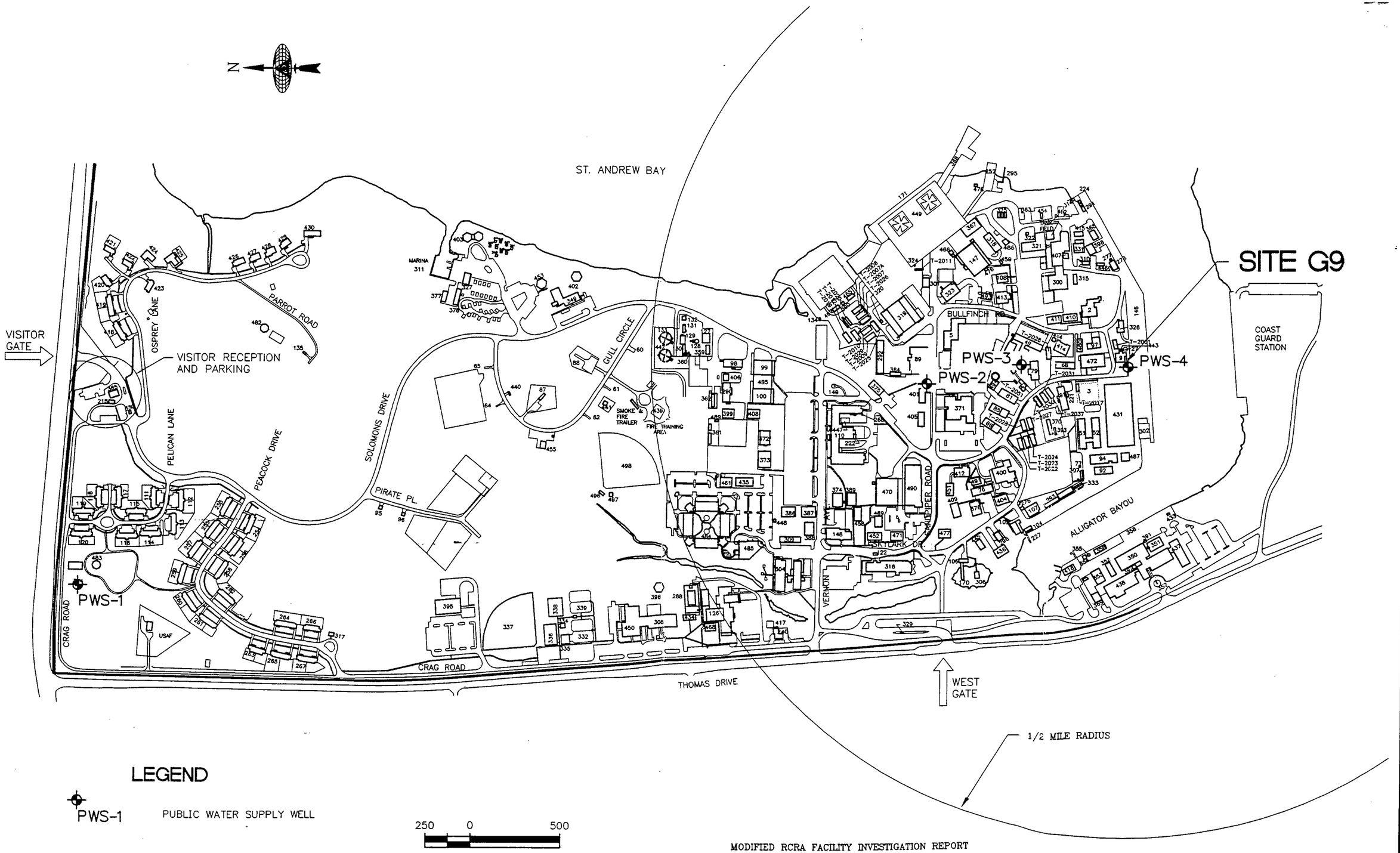
The CSS is provided potable water from the Bay County Water System, operated by the Bay County Public Utilities Department. The system draws surface water from Deer Point Lake, located 7 miles northeast of CSS. The use of county water in urban areas such as Panama City, has been reported at 83 to 95 percent.

Panama City Beach operates a public water system which uses a combination of groundwater withdrawal and surface water. The groundwater is obtained from 13 wells located in western Bay County and surface water is purchased from the county water system.

The RCRA Facility Investigation Report indicate records from the Northwest Florida Water Management District list 42 permitted wells screened in the surficial aquifer system in the vicinity of CSS. These 42 wells are classified as "domestic" or other "public supply". The permitted wells are 2-inch and 4-inch-diameter wells with capabilities generally less than 20 gallons per minute.

Four public water supply wells are located at CSS. The location of the wells are provided on Figure 1-5. These wells have 12-inch diameter casings and are completed at depths of 350 to 400 feet below land surface (bls). Of the four wells, only PWS-1, located near the housing area at Building 394 adjacent to highway 98, is currently in use. It is used to provide water for air conditioning and heat pumps only and draws water from the Floridan aquifer system at approximately 400 feet bls. The remaining wells are inactive.

No private potable wells or public potable supply wells were identified in the RCRA Facility Investigation Report as being within a 1/4-mile and 1/2-mile radius of the site, respectively.



LEGEND

PWS-1 PUBLIC WATER SUPPLY WELL

250 0 500

Scale 1" = 500'

MODIFIED RCRA FACILITY INVESTIGATION REPORT

SITE MANAGER: GFG	CHECKED BY: GFG
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SURVEYED BY: –	SURVEY DATE: –
SCALE: 1" = 500'	
CAD DWG. NO.: G9–PWEL	PROJ. NO.: 7113

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FIGURE 1–5
LOCATION OF PUBLIC WATER SUPPLY WELLS
SITE G9
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

1.3 SITE HISTORY AND OPERATIONS

1.3.1 Site History

CSS is one of seven major research, test, and evaluation laboratories of the Space and Naval Warfare Systems Command. The site was first established in 1942 as a harbor for World War II convoy ships and as a liaison with a nearby shipyard. It later became an amphibious landing craft operations school. Research and development began in 1945 when a facility was renamed the U.S. Navy Research Countermeasures Station. In 1952 a research and development program for the use of helicopters for mine countermeasures operations was implemented at the Base. The facility was redesignated as the Naval Coastal Systems Center in 1978 and again as Coastal Systems Station in January 1992 (ABB Environmental Services, Inc. 1995).

Site G9 contained a 1,200 gallon UST which supplied diesel fuel to an emergency backup generator located in Building 9. The tank and product lines were constructed of steel and contained no secondary containment features. The age of the UST system is unknown (Mike Clayton, August 8, 1996).

1.3.2 Structural Integrity of Tanks and Lines

No structural integrity testing of the tank and lines were performed on this tank. At the time the tank was removed in March 1994, the tank was observed to be in good condition with no corrosion or pitting on the tank structure (Mike Clayton, August 8, 1996).

1.3.3 Initial Remedial Action

No initial remedial actions have been conducted at the site. No free product or excessive soil contamination, as defined in Chapter 62-770, FAC., was encountered during removal of the diesel UST in March 1994.

1.3.4 Previous Investigations

During removal of the UST system, Southern Earth Sciences, Inc. collected soil samples for hydrocarbon vapor screening using an organic vapor analyzer (OVA). The soil samples were collected from each side and the bottom of the tank excavation, and adjacent to the product line. Results of the soil screening identified no soil hydrocarbon vapors in soil samples collected from the vadose zone. A soil sample collected at the water table near the center of the tank excavation reported a hydrocarbon vapor concentration of 28 parts per million (ppm). During removal of the tank and product line, no petroleum

product odors were identified in the excavation or in excavated soils. The soil vapor sample locations and the depth of sample collection with corresponding OVA readings, are provided in Appendix C.

During excavation of the diesel tank, the depth to groundwater was reported at 11 feet bls. A temporary well was installed in the tank excavation and groundwater was sampled from the well on March 24, 1994 for EPA Method 602 and 610 parameters. The groundwater sample results identified total naphthalenes and Polynuclear Aromatic Hydrocarbons (PAHs) at 113 and 48 micrograms per liter (ug/L), respectively. These concentrations exceeded the State Target Levels of 100 ug/L for total naphthalenes and 10 ug/L for PAHs. The Closure Assessment Form and Storage Tank Closure Assessment report are provided in Appendix D.

2.0 SUBSURFACE INVESTIGATION METHODS

2.1 QUALITY ASSURANCE

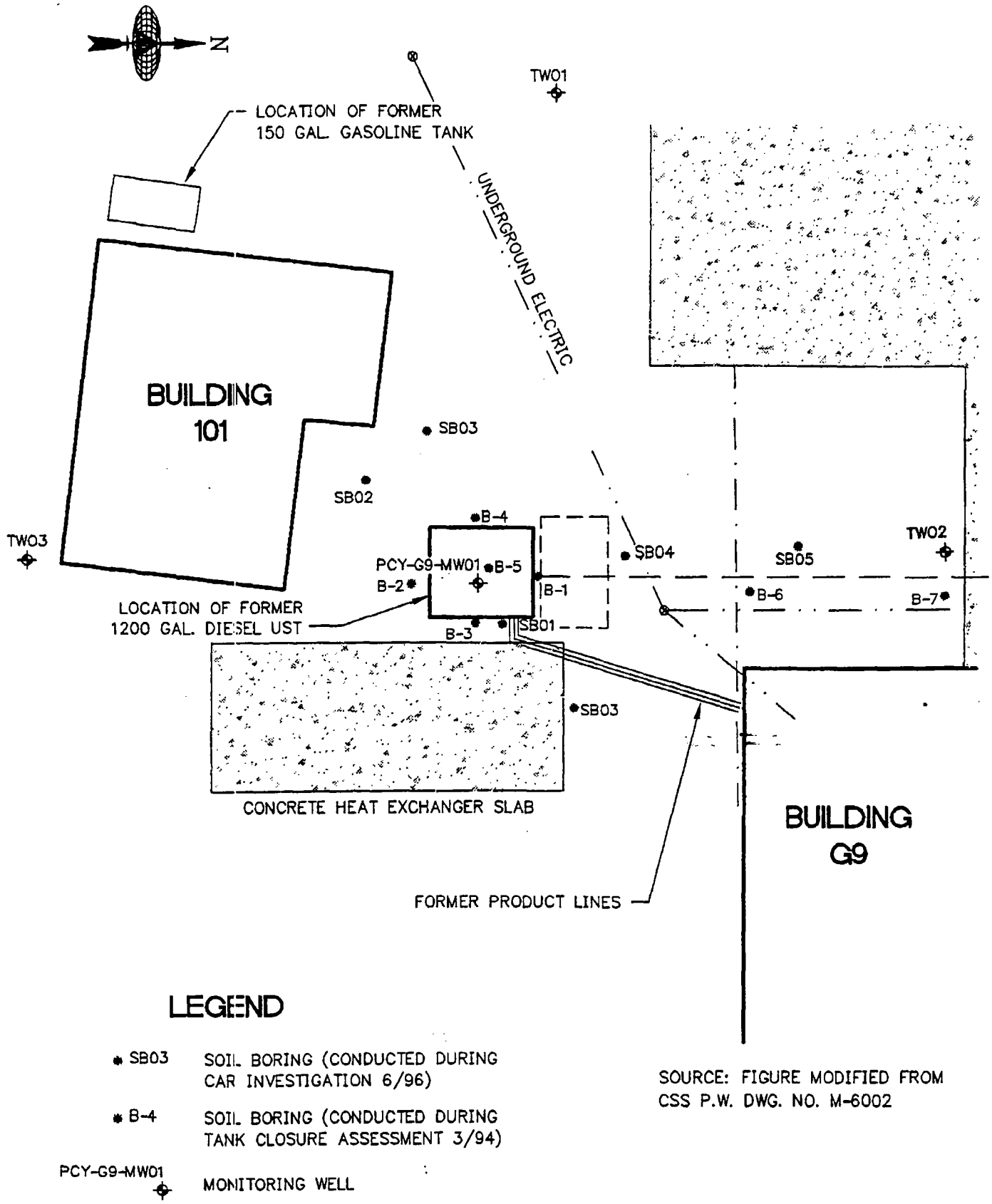
The site investigation was conducted in accordance with the Standard Operating Procedures prescribed by the FDEP Quality Assurance Section Document DER-001/92, and adopted by the B&R Environmental Comprehensive Quality Assurance Plan Number 870055G.

2.2 SOIL BORINGS PROCEDURES

2.2.1 Hand-Auguered Soil Borings

A soil hydrocarbon vapor assessment was conducted at the site by B&R Environmental on June 12, 1996. Five soil borings were excavated in the immediate area surrounding the former diesel UST. Soil samples were collected from each boring for the purpose of organic vapor screening and for lithologic description. Results of the soil vapor screening would be collaborated with the soil vapor data collected during removal of the diesel tank and product line to determine the horizontal and vertical extent of petroleum contamination in the vadose zone near the diesel UST. Soil borings were advanced using a 3.5 inch inside diameter (ID) stainless steel bucket auger. Soil samples were collected at two foot intervals until the water table was encountered. Wet soils were present at depths ranging from approximately 8.5 to 10.5 feet bls. Soil boring locations and boring completion depths are summarized on Figure 2-1 and Table 2-1, respectively. Soil boring logs are provided in Appendix E.

Prior to the advancement of the hand auger at each boring location, the hand auger was decontaminated according to the B&R Environmental Comprehensive Quality Assurance Plan.



LEGEND

- SB03 — SOIL BORING (CONDUCTED DURING CAR INVESTIGATION 6/96)
- B-4 — SOIL BORING (CONDUCTED DURING TANK CLOSURE ASSESSMENT 3/94)
- PCY-G9-MW01 — MONITORING WELL

SOURCE: FIGURE MODIFIED FROM CSS P.W. DWG. NO. M-6002

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SCALE: 1"=8'	
CAD DWG. NO.: 7113-G9	PROJ. NO.: 7113

Brown & Root Environmental

FIGURE 2-1
SOIL BORING LOCATIONS
SITE G9
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

TABLE 2-1
SOIL VAPOR MEASUREMENTS
Coastal Systems Station Site G9
Panama City, Florida
FDEP FACILITY No. 038518667

Soil Boring No.	Date of Measurement	Sample Interval (feet bls)	Headspace Readings (ppm)		
			Total Organic Reading	Carbon Filtered Reading	Net Reading
SB01	06-12-96	2	2	ND	2
		4	2	ND	2
		6	2	ND	2
		8	ND	-	ND
		auger refusal at 8.5 feet bls			
SB02	06-12-96	2	ND	-	ND
		4	2	ND	2
		6	ND	-	ND
		8	ND	-	ND
		10	2	ND	2
SB03	06-12-96	2	ND	-	ND
		4	ND	-	ND
		6	ND	-	ND
		8	ND	-	ND
		10	ND	-	ND
SB04	06-13-96	2	ND	-	ND
		4	ND	-	ND
		6	ND	-	ND
		auguer refusal at 6.5 feet bls.			
SB05	06-13-96	2	ND	-	ND
		4	ND	-	ND
		6	ND	-	ND
		8	ND	-	ND
TW01	06-13-96	2	ND	-	ND
		4	ND	-	ND
		6	ND	-	ND
TW02	06-13-96	2	ND	-	ND
		4	ND	-	ND
		6	7	7	ND
TW03	06-14-96	2	ND	-	ND
		4	ND	-	ND
		7	ND	-	ND
MW01	06-13-96	2	ND	-	ND
		4	ND	-	ND
		6	3	1	2

- not analyzed
bls below land surface
ppm part per million equivalent methane
ND not detected

Wet soils encountered at depths ranging from approximately 8 to 10.5 feet bls.

2.2.2 Drilling and Soil Sampling Methods

On June 13 and 14, 1996, four borings (TW01, TW02, TW03, and PCY-G9-MW01) were drilled by Groundwater Protection, Inc. under the supervision of B&R Environmental geologist. These borings were advanced to facilitate groundwater monitoring installations. Soil samples collected during borehole advancement were used to characterize the site lithology and provide additional assessment data on soil hydrocarbon vapor concentrations in the area. The location of the borings are shown on Figure 2-1, and soil boring logs are included in Appendix E.

Buried utilities were investigated at each boring location by advancing the soil boring with a post hole digger from 0 to 4 feet bls. The borings were continued with a truck mounted drill rig, using 4 1/4-inch inside diameter (ID) hollow stem augers. Soil samples were collected using a split spoon sampler and standard penetrations tests were conducted in accordance with the American Society for Testing and Materials (ASTM) recommended procedures.

Prior to the collection of the soil samples and well installations, the auger flights, drill rods, and split spoons were decontaminated according to B&R Environmental Comprehensive Quality Assurance Plan.

Soil samples were visually inspected for evidence of oil staining. Headspace analysis was conducted on each soil sample collected above the water table. Grab samples were collected at two foot intervals from approximately 0 to 4 feet bls. Soil vapor analysis was performed in accordance with the headspace method presented in detail in Appendix F. Hydrocarbon vapor concentrations from soil vapor analysis are summarized in Table 2-1.

Soil cuttings generated during the well installations were placed in a 55-gallon steel drum. A composite soil sample was collected from the drum and analyzed for TCLP (SW-846 1311) organic and metals, reactivity, and corrosivity. The soil was removed for proper disposal by a Florida licensed waste hauler.

2.3 WELL CONSTRUCTION

The wells were installed in conjunction with the soil boring procedures discussed above in Section 2.2.2. The wells were screened to intersect the water table. Monitoring well placements were selected to provide areal coverage around the former diesel UST for groundwater sampling. Results of the sampling would be used to evaluate if a dissolved hydrocarbon plume

exists in the area of the former diesel UST system.

The monitoring wells were installed using a Diedrick D 120C Model drill rig. Wells PCY-G9-MW01, TW01, and TW02 were advanced using 4 1/4-inch (ID) hollow stem augers. Temporary well TW03 was installed using an wash down point due to flowing sands encountered at the boring. Each well was constructed of 2-inch ID threaded schedule 40 PVC solid riser and 0.010-inch slots with silt trap and well bottom cap. Wells PCY-G9-MW01, TW01, and TW02 were completed at approximately 15 feet bls. Well TW03 was completed at approximately 12 feet bls. Each annulus was filled to approximately 1 foot above the well screen with 20/30 silica sand. In each well, a one foot layer of bentonite pellets was placed above the sand pack and hydrated. In well PCY-G9-MW01, the remainder of the well annulus was grouted to within 3 inches of the top of well casing The well is secured with a locking, water-tight cap within a steel 8-inch diameter steel manhole. The manhole was set within a 24-inch square concrete apron finished slightly above grade. The borehole annulus for the temporary wells were filled with sand. The temporary wells are completely slightly above surface grade and are secured with a locking water-tight cap. Well completion logs are provided in Appendix G.

Each well was developed using a centrifugal pump. During well development, field measurements of pH, temperature, and specific conductance were monitored from purge water generated during well development. The wells were developed up to a maximum of one hour or until the field measurements became stable and the purge water clear. Water quality stabilization was determined using the following criteria: temperature +/-05^{O}C, pH +/-0.1 unit, and specific conductivity +/-10 umhos/cm. The wells were developed under the supervision of a geologist. All development water was containerized for disposal.

2.4 LITHOLOGIC SAMPLING

Representative soil samples were collected to assess the shallow subsurface geologic conditions at the site. Samples used for lithologic description were collected from a stainless steel hand auger or split spoon sampler during the soil boring and monitoring well installations. Soil boring logs are included as Appendix E.

2.5 SOIL VAPOR ANALYSIS

Headspace analysis was conducted on each soil sample using an Organic Vapor Analyzer-Flame Ionization Detector (OVA-FID). The soil vapor analysis was performed according to the

headspace method prescribed in Rule 62-770.200 (2) FAC. Screened soil samples with corrected headspace levels in excess of 50 ppm are defined as "excessively contaminated" soil at diesel contaminated sites. The Headspace Methodology for Determining Soil Organic Vapor Concentrations is described in detail in Appendix F.

2.6 HYDROLOGIC INVESTIGATION

The depths to water in monitoring wells PCY-G9-MW01, TW01, TW02, and TW03 were measured on July 12, 1996. Measurements were collected from the top of well casings using an electronic water level indicator. The water level measurements were collected to document depth to water to the surficial aquifer. The water level measurement field forms are provided in Appendix H. The hydraulic gradient and a tidal influence study was not conducted based on the groundwater analytical results (Section 3.3) from groundwater samples collected at the site.

2.7 WATER SAMPLING

2.7.1 Free Product Sampling

Prior to groundwater sampling on July 12, 1996, B&R Environmental personnel checked each well for free product using a pre-cleaned Teflon® bailer. The Teflon® bailer was used to extract a water sample from the top of the well's water column to visually inspect for free product. Free product was not encountered during the CA by B&R Environmental personnel.

2.7.2 Groundwater Sampling

Groundwater sampling was performed to determine the presence or absence of dissolved petroleum hydrocarbons in shallow groundwater in the vicinity of the diesel UST system. Groundwater samples were collected by B&R Environmental personnel from well PCY-G9-MW01, and temporary wells TW01, TW02, and TW03, on July 12, 1996. Groundwater samples collected from PCY-G9-MW01 were analyzed using EPA Method 239.2 for lead (unfiltered), EPA Method 504.1 for gas chromatograph (GC) Extractable Volatile Organic (1,2-dibromoethane or EDB), EPA Method 601 for GC Purgeable Halocarbons, and EPA Method 602 for GC Purgeable Aromatics (benzene, toluene, ethylbenzene, and xylenes, and methyl-tert butyl ether), EPA Method 610 for GC PAHs, and EPA Method 418.1 for Total Petroleum Recoverable Hydrocarbons (TRPH). Groundwater samples collected from the temporary wells were analyzed for EPA Method 610 parameters only. The lead sample collected at PCY-G9-MW01, was

collected using new silicon tubing and a peristaltic pump. The remainder of the groundwater parameters analyzed during the sampling event were collected using pre-cleaned Teflon® bailers. Approximately five well volumes of groundwater was removed from each well using a pre-cleaned Teflon® bailer. Temperature, pH, conductivity measurements and well purge volumes were recorded at the time of sample collection and are provided in Appendix H Groundwater samples were placed on ice and shipped to Quality Analytical Laboratories, Inc., in Montgomery, Alabama.

Groundwater samples were collected in accordance with the FDEP approved comprehensive quality assurance (QA) plan. During the sampling events, quality control samples (i.e. equipment blanks) were prepared and submitted to the laboratory as required by the approved QA procedures. Sampling activities were documented in a site specific field logbook, and samples were transmitted under chain-of-custody protocols.

3.0 RESULTS OF INVESTIGATION

3.1 SITE HYDROGEOLOGY

3.1.1 Lithology

The site is underlain by light brown to yellowish orange fine to medium grained quartz sand. to a depth of approximately 15 feet bls. Due to the homogeneity of the subsurface, no lithologic cross-section was constructed. Soil boring logs are included as Appendix E.

3.1.2 Depth to Groundwater

The site is underlain by the surficial aquifer which is classified as a G-II aquifer by the State of Florida. Based on water level data collected on July 12, 1996, the depth to the shallow aquifer at the site is approximately 8 feet bls The depth to groundwater measurements are presented in Table 3-1. The water level measurement field forms are provided in Appendix H.

3.2 SOIL QUALITY

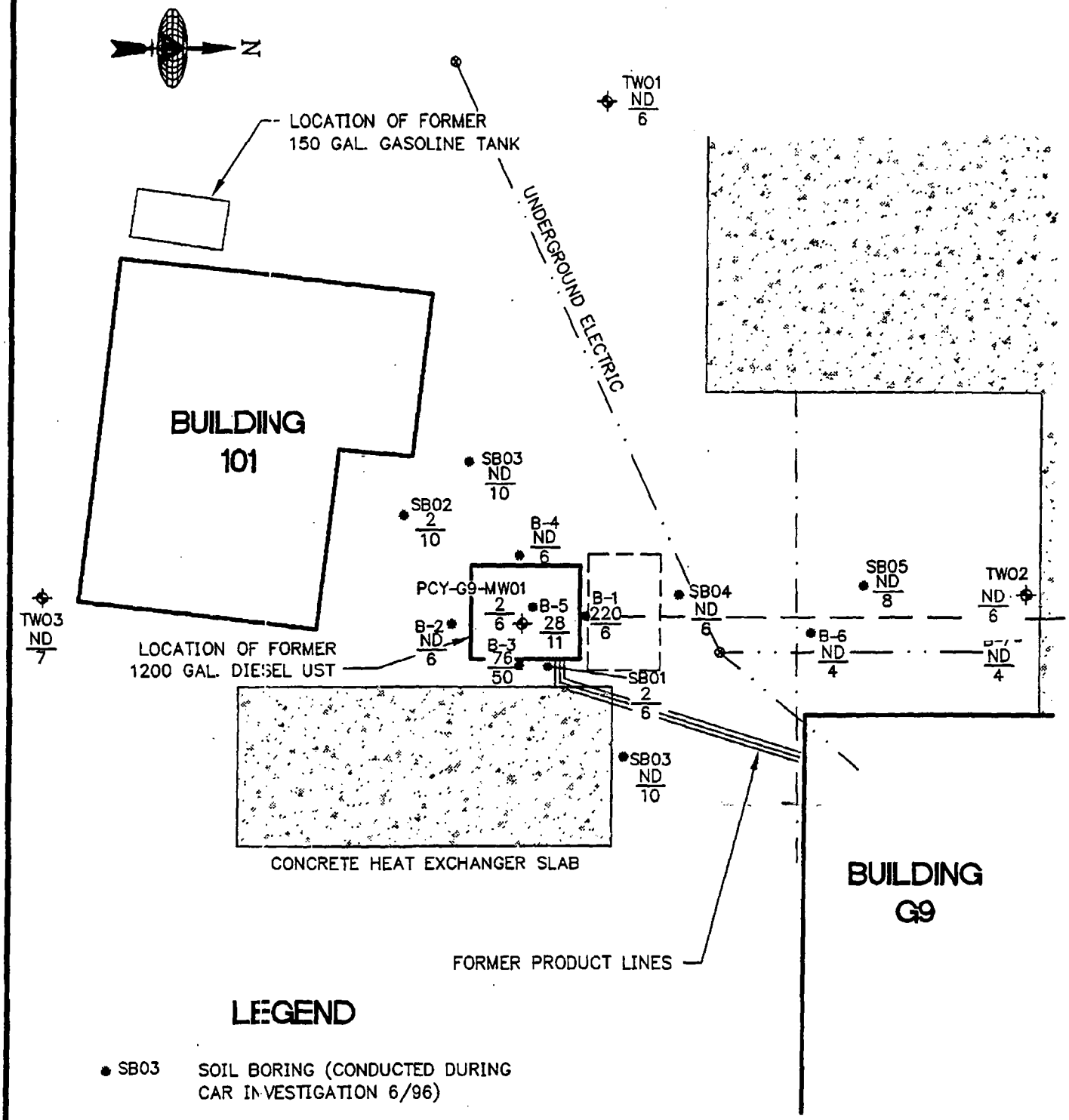
The highest soil hydrocarbon vapor concentrations detected in soils from the soil vapor survey was 2 ppm. A soil hydrocarbon vapor concentration of 2 ppm was detected at soil boring locations SB01, SB02, and PCY-G9-MW01. These boring locations were located within or near the perimeter of the former diesel UST location. "Excessively contaminated" soil was not encountered in samples collected during the CA. Hydrocarbon vapors were not detected in soils from six of the nine soil boring locations conducted during June 1996. Soil vapor screening results are presented in Table 2-1. Soil boring locations and vapor readings are depicted on Figure 3-1.

TABLE 3-1
DEPTH TO GROUNDWATER MEASUREMENTS
Site G9
Coastal Systems Station, Panama City, Florida
FDEP Facility No. 038518667

Well Number	Date	Free Product Thickness (feet)	Depth to Water (feet)	Well Screen Interval (feet below land surface)
PCY-G9-MW01	07/12/96	0.00	8.81	5 to 15
TW01	07/12/96	0.00	8.81	5 to 15
TW02	07/12/96	0.00	8.03	5 to 15
TW03	07/12/96	0.00	8.88	2 to 12

Notes:

All water levels are measured below top of casing.



LEGEND

- ● SB03 — SOIL BORING (CONDUCTED DURING CAR INVESTIGATION 6/96)
- ● B-4 — SOIL BORING (CONDUCTED DURING TANK CLOSURE ASSESSMENT 3/94)
- PCY-G9-MW01 ⌖ — MONITORING WELL
- ND / 10 — HIGHEST SOIL HYDROCARBON VAPOR CONCENTRATION (ppm) / DEPTH OF SOIL SAMPLE (FT.)

SOURCE: FIGURE MODIFIED FROM CSS P.W. DWG. NO. M-6002

SITE MANAGER: GFG	CHECKED BY: -
DRAWN BY: TCB	DRAWING DATE: 11/11/96
SURVEYED BY:	SURVEY DATE:
SCALE: 1"=8'	
CAD DWG. NO.: 7113-G9	PROJ. NO.: 7113

Brown & Root Environmental

FIGURE 3-1
SOIL HYDROCARBON VAPOR CONCENTRATIONS – SITE G9
COASTAL SYSTEMS STATION
PANAMA CITY, FLORIDA

3.3 WATER QUALITY

Laboratory analysis of the groundwater samples for all parameters analyzed under EPA Methods 601, 602, 610, and 504.1 were reported below laboratory detection limits. Total lead was detected in the groundwater samples from PCY-G9-MW01 at 20.1 micrograms per liter (ug/L). The total lead concentration is below the State Target Level of 50 ug/L for dissolved lead. A Total Recoverable Petroleum Hydrocarbon (TRPH) concentration of 10.7 mg/L was reported in the groundwater sample collected from PCY-G9-MW01. The TRPH concentration is slightly above the State Target Level of 5 mg/L.

Chloroform, which is a common laboratory contaminant, was detected at 1.6 ug/L in the groundwater sample collected from PCY-G9-MW01. Concentrations of total lead and toluene were reported in the equipment blank at of 0.79 ug/L and 1.2 ug/L, respectively. The groundwater sampling data from monitoring well PCY-G9-MW01 will be considered acceptable even though toluene and lead was detected in the equipment blank sample. Toluene was reported below detection limits in the groundwater sample collected from PCY-G9-MW01. The total lead concentration of 20.1 ug/L reported in PCY-G9-MW01 was well below the State target level of 50 ug/L. A summary of groundwater analytical results are presented in Table 3-2. Groundwater laboratory analytical results are provided as Appendix I. Field sampling forms are included in Appendix H.

TABLE 3-2
SUMMARY OF GROUNDWATER QUALITY:
SELECTED PARAMETERS FROM THE GASOLINE AND KEROSENE ANALYTICAL GROUP
Site G9
Coastal Systems Station, Panama City, Florida
FDEP ID No. 038518667

Well ID	Date Sampled	Benzene (µg/L)	Total VOA (µg/L)	MTBE (µg/L)	DCE (µg/L)	EDB (µg/L)	Napthelene (µg/L)	Total Naphthelenes (µg/L)	TRPH (mg/L)	Lead Unfiltered Samples (µg/L)
PCY-G9-MW01	07/12/96	<1.0	NCD	< 1.0	<1.0	<0.02	<20	NCD	10.7	20.1
TW01	07/12/96	<1.0	NA	NA	NA	NA	<2	NCD	NA	NA
TW02	07/12/96	<1.0	NA	NA	NA	NA	<2	NCD	NA	NA
TW03	07/12/96	<1.0	NA	NA	NA	NA	<2	NCD	NA	NA
Trip Blank	07/12/96	<1.0	NCD	<1.0	<1.0	NA	NA	NA	NA	NA
Equipment Blank	07/12/96	< 1.0	1.2	< 1.0	<1.0	<0.02	<2	NCD	<0.05	0.79

NA not analyzed
Total VOA total volatile organic aromatics = sum of benzene, toluene, ethylbenzene, and xylenes
MTBE methyl tert-butyl ether
DCE 1,2-Dichloroethane
EDB 1,2-Dibromoethane = ethylene dibromide
NCD no constituents detected
TRPH total petroluem hydrocarbons

4.0 DISCUSSION

"Excessively contaminated" soil, as defined by Chapter 62-770.200 FAC, was not detected within the vadose zone by B&R Environmental during this CA. Free product was not encountered during the CA. Water quality data from groundwater samples collected at the site indicate low levels of dissolved hydrocarbons (TRPH) being present in groundwater directly beneath the former diesel UST. The source of the petroleum release is likely the former diesel UST . The diesel UST was not equipped with secondary containment features which may have contributed to the petroleum release. The absence of diesel constituents in groundwater samples collected from the temporary wells installed around the perimeter of the UST system, supports the UST tank as being the source point for the release.

Depth to water to the surficial aquifer (water table) has been documented at approximately 8 feet bls. The total dissolved solids content in the surficial aquifer in the area of CSS, qualifies the aquifer as a G-II aquifer (Chapter 62-3.403 FAC).

Well fields and surface water intakes which supply drinking water to the local area are located outside a 0.50-mile radius of the site. Domestic water wells were not identified within 0.25-mile of the site. Surface water bodies and freshwater aquifers utilized in the study area are not likely to be threatened by the levels of hydrocarbons detected at the site.

5.0 CONCLUSIONS AND RECOMMENDATION

The results of B&R Environmentals's CA at CSS Building G9 suggest the following:

- Groundwater in the surficial aquifer at the site has a G-II classification;
- Private potable water wells were not identified within 0.25-mile radius of the site. Municipal well fields were not identified within a 0.50-mile radius of the site;
- Excessively contaminated soil was not encountered during the CA;
- Free product was not encountered at the site; and
- TRPH was detected in a groundwater sample collected from a monitor well installed at the former diesel UST location. The TRPH concentration was 10.7 mg/L which is slightly above the State Action Level of 5 mg/l. Total lead was reported in the groundwater at 20.1 ug/L, below the State Action Level of 50 ug/L. All other dissolved petroleum constituents analyzed in groundwater samples collected at the site were reported below laboratory detection limits and do not exceed FDEP No Further Action (NFA) criteria for a G-II aquifer, without wells (FDEP, 1990) (Table 5-1);

Based upon the hydrogeological and chemical data presented in this CAR, and the CA criteria for NFA status as described in Rule 62-770.600(5) FAC, and the FDEP Publication FDER-10/90, B&R Environmental proposes a **NFA** status for the site.

TABLE 5-1
MAXIMUM ACCEPTABLE GROUNDWATER CONSTITUENT LEVELS
Site G9
Coastal Systems Station, Panama City, Florida
FDEP Facility No. 038518667

Analyte or Analytical Method	Highest Ground Water Constituent Level in Site Monitoring Wells	No Further Action		Monitoring Only			
		G-II Aquifer (with wells)	G-II Aquifer (without wells)	G-II Aquifer with wells		G-II Aquifer without wells	
				source	perimeter	source	perimeter
Total BTEX	NCD	50	50	500	50	1000	50
Benzene	<1.0	1	50	250	1	500	50
TRPH	10.7^	5^	5^	50^	5^	100^	5^
Lead	20.1	50	50	500	50	1^	50
EDB	<0.02	0.02	0.02	0.02	0.02	0.4	0.02
Total Naphs	NCD	100	100	1000	100	2000	100
EPA 610	<2	DL	DL	10xDL	DL	20xDL	DL
EPA 601	<1.0	DW-SRLs	DW-SRLs	10xDW-SRLs	DW-SRLs	20xDW-SRLs	DW-SRLs
Arsenic	NA	50	50	500	50	1^	50
Cadmium	NA	10	10	100	10	200	10
Chromium	NA	50	50	500	50	1^	50
EPA 624	NA	DW-SRLs	DW-SRLs	10xDL-SRLs	DW-SRLs	20xDW-SRLs	DW-SRLs
EPA 625	NA	DW-SRLs	DW-SRLs	10xDL-SRLs	DW-SRLs	20xDW-SRLs	DW-SRLs

Notes:
All data in µg/L unless otherwise noted
^ data in mg/L
Source: monitoring wells near suspected hydrocarbon source
Perimeter: Monitoring wells located at perimeter of plume
TRPH: Total Recoverable Petroleum Hydrocarbons
Total Naphs: sum of naphthalenes and methylnaphthalenes
DW-SRLs: Drinking Water Standards or Applicable Site Rehabilitation Levels
DL: Detection Limit
NCD No Constituents Detected
NA Not Analyzed

6.0 REFERENCES

ABB Environmental Services, Inc., 1995, RCRA Facility Investigation , Coastal Systems Station Panama City, Florida.

Clayton, Michael, November 18, 1995, personal communication, Environmental Engineer, Coastal Systems Station

Clayton, Michael, August 8, 1996, personal communication, Environmental Engineer, Coastal Systems Station.

Florida Department of Environmental Protection, October 1990. *No Further Action and Monitoring Only Guidelines for Petroleum Contaminated Sites.* Guidance document issued by Bureau of Waste Cleanup, Technical Review Section.

U.S. Geological Survey. Panama City, FLA., Quadrangle 1982. 7.5 minute series, Topographic Quadrangle Maps of Florida: scale 1:24,000.

U.S. Geological Survey. Panama City Beach, FLA., Quadrangle 1982. 7.5 minute series, Topographic Quadrangle Maps of Florida: scale 1:24,000.

APPENDIX A

FDEP CORRESPONDENCE

Florida Department of Environmental Regulation
Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

DER Form # 17-761.900(1)
Form Title Discharge Reporting Form
Effective Date December 10, 1990
DER Application No. _____ (Filled in by DER)

Discharge Reporting Form

Use this form to notify the Department of Environmental Regulation of:

1. Results of tank tightness testing that exceed allowable tolerances within ten days of receipt of test result.
2. Petroleum discharges exceeding 25 gallons on pervious surfaces as described in Section 17-761.460 F.A.C. within one working day of discove
3. Hazardous substance (CERCLA regulated), discharges exceeding applicable reportable quantities established in 17-761.460(2) F.A.C., wit one working day of the discovery.
4. Within one working day of discovery of suspected releases confirmed by: (a) released regulated substances or pollutants discovered the surrounding area, (b) unusual and unexplained storage system operating conditions, (c) monitoring results from a leak detection meth or from a tank closure assessment that indicate a release may have occurred, or (d) manual tank gauging results for tanks of 550 gallc or less, exceeding ten gallons per weekly test or five gallons averaged over four consecutive weekly tests.

Mail to the DER District Office in your area listed on the reverse side of this form

PLEASE PRINT OR TYPE
Complete all applicable blanks

1. DER Facility ID Number: 038518667 2. Tank Number: G9 3. Date: 5/20/94
4. Facility Name: Coastal Systems Station

   Facility Owner or Operator: U.S. Navy

   Facility Address: 6703 West Highway 98, Panama City, FL 32407-7001

   Telephone Number: (904) 235-5859 County: Bay

   Mailing Address: Commanding Officer, Coastal Systems Station, Code 3610MC, 6703 West Highway Panama City, FL 32407-7001
5. Date of receipt of test results or discovery: 5-6-94 month/day/ye
6. Method of initial discovery. (circle one only)
   A. Liquid detector (automatic or manual)
   B. Vapor detector (automatic or manual)
   C. Tightness test (underground tanks only).
   D. Emptying and Inspection.
   E. Inventory control.
   F. Vapor or visible signs of a discharge in the vicini
   (G) Closure: Groundwater Analysi(expla
   H. Other: _____
7. Estimated number of gallons discharged: _____
8. What part of storage system has leaked? (circle all that apply) A. Dispenser B. Pipe C. Fitting D. Tank E. Unkno
9. Type of regulated substance discharged. (circle one)
   A. leaded gasoline
   B. unleaded gasoline
   C. gasohol
   D. vehicular diesel
   F. aviation gas
   G. jet fuel
   L. used/waste oil
   (M) diesel
   O. new/lube oil
   V. hazardous substance includes pesticides, ammon chlorine and derivatives (write in name or Chemical Abstra Service CAS number) _____
   Z. other (write in name) _____
10. Cause of leak. (circle all that apply)
    A. Unknown
    B. Split
    C. Loose connection
    D. Corrosion
    E. Puncture
    F. Installation failure
    G. Spill _____
    H. Overfill
    (I.) Other (specify) Suspect - Contamination from adjacent contaminat site being investig
11. Type of financial responsibility. (circle one)
    A. Third party insurance provided by the state insurance contractor
    B. Self-insurance pursuant to Chapter 17-769.500 F.A.C.
    (C) Not applicable
    D. None
12. To the best of my knowledge and belief all information submitted on this form is true, accurate, and complete.

W. O. WALKER, LIEUTENANT COMMANDER, PWO
Printed Name of Owner, Operator or Authorized Representative

W.O. Walker
Signature of Owner, Operator or Authorized Representative

Northwest District | Northeast District | Central District | Southwest District | South District | Southeast District

APPENDIX B

CAR SUMMARY SHEET

Facility Name: Coastal Systems Station — Reimbursement Site ☐
Location: Panama City, Florida — State Contract Site ☐
EDI #: _____ FAC I.D. #: 038518667 — Other: ☒

(1) Source of spill: UST — Date of spill: Unknown

(2) Type of product:

gasoline group	gasoline lost	kerosene group	gallons lost
☐ leaded		☐ kerosene	
☐ unleaded regular		☒ diesel	Unknown
☐ unleaded premium		☐ JP-4 Jet fuel	
☐ gasohol		☐ Jet A fuel	

(3) Description of IRA (if any): N/A
☐ Free product removal: _____ (gals)
☐ Soil removal: _____ (cubic yds)
☐ Soil incineration: _____ (cubic yds)

(4) Free product still present? (yes/no) Maximum apparent product thickness: 0 (ft)

(5) Maximum groundwater contaminant levels (ppb): Total VOA: BDL benzene: BDL EDB: BDL Lead: 20.1 MTBE: BDL other: TRPH 10.7 mg/l

(6) Brief lithologic description: light brown to orange fine to medium grained Sand.

(7) Areal and vertical extent of soils contamination defined? (yes/no)
High current soil concentration (OVA: 2 ppm) or (EPA Method 5030/8020: - ppb)

(8) Lower aquifer contaminated? (yes/no) Depth of vertical contamination: 15 (ft)

(9) Date of last complete round of groundwater sampling: 7/12/96. Date of last soil sampling: 6/12/96.

(10) QAPP approved? (yes/no) Date: 6/16/95

(11) Direction (e.g. NNW) of surficial groundwater flow: Not Determined (Figure _____ on page _____)

(12) Average depth of groundwater: 8 (ft)

(13) Observed range of seasonal groundwater fluctuations: Not Determined (ft)

(14) Estimated rate of groundwater flow: Not Determined (ft/day)

(15) Hydraulic gradient across site: Not Determined (ft/ft)

(16) Aquifer characteristics:

	Value	Units	Methods
Hydraulic conductivity	-		
Storage coefficient	-		
Aquifer thickness	-		
Effective soil porosity	-		
Transmissivity	-		

(17) Other remarks: Aquifer characteristics were not determined because No Further Action is recommended.

APPENDIX C

TANK CLOSURE ASSESSMENT SOIL BORING FIGURE AND TABLE

TABLE I

FIELD OVA DATA

SAMPLE	DEPTH (FEET)	OVA W/O FILTER (PPM)	OVA W/FILTER (PPM)	CORRECTED OVA (PPM)
B-1	3	0	0	0
	6	0	0	0
B-2	3	0	0	0
	6	0	0	0
B-3	3	0	0	0
	6	0	0	0
B-4	3	0	0	0
	6	0	0	0
B-5	7	0	0	0
	11	28	0	28
Product line				
B-6	2	0	0	0
	4	0	0	0
B-7	2	0	0	0
	4	0	0	0

PPM = parts per million

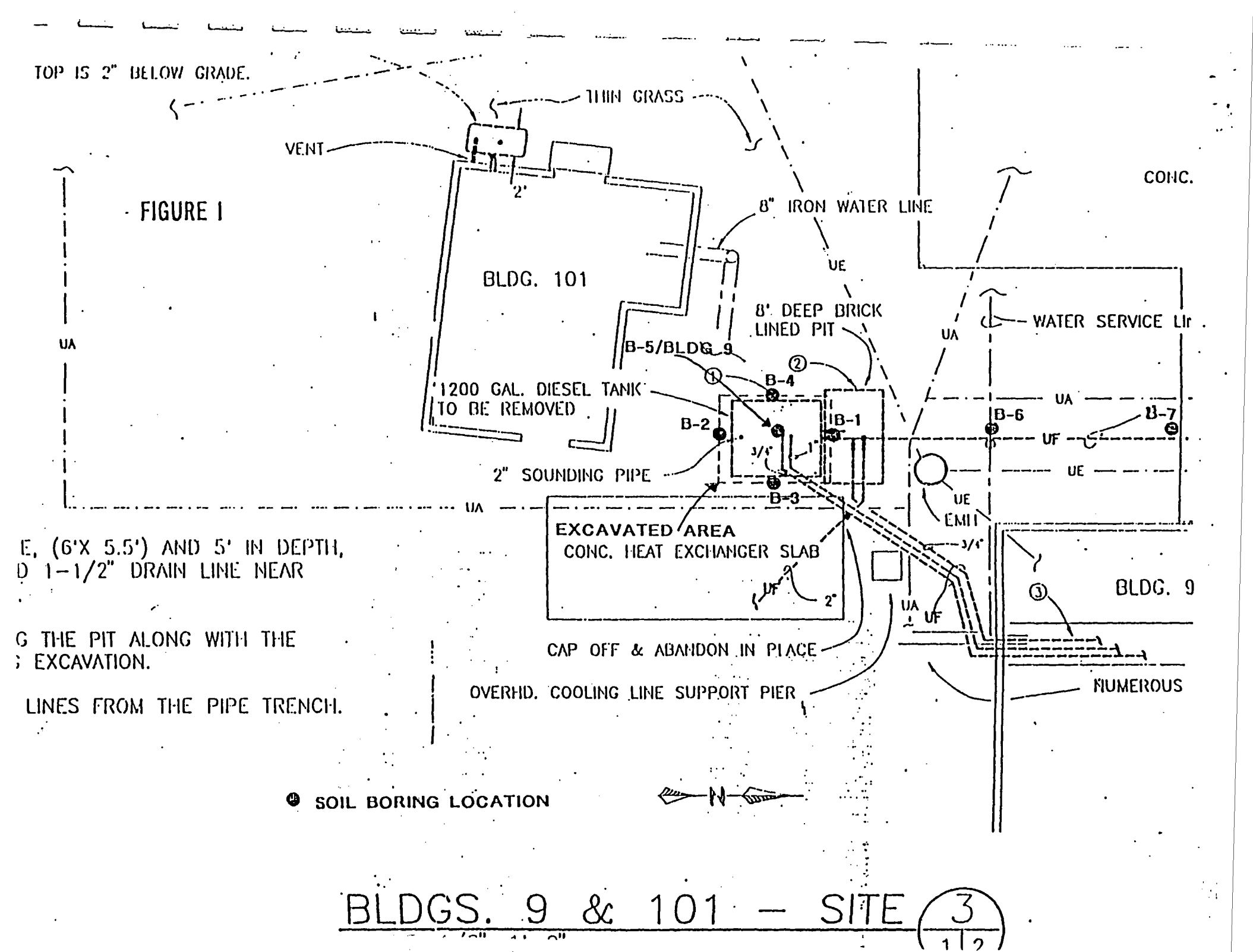


FIGURE 1

E, (6'X 5.5') AND 5' IN DEPTH,
D 1-1/2" DRAIN LINE NEAR

G THE PIT ALONG WITH THE
; EXCAVATION.

LINES FROM THE PIPE TRENCH.

BLDGS. 9 & 101 - SITE 3

APPENDIX D

TANK CLOSURE ASSESSMENT FORM AND TANK CLOSURE ASSESSMENT REPORT

Florida Department of Environmental Regulation
Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

DER Form #
Form Title: Closure Assessment Form
Effective Date: December 10, 1990
DER Application No.
(If Assigned by DER)

Closure Assessment Form

Owners of storage tank systems that are replacing, removing or closing in place storage tanks shall use this form to demonstrate that a sto system closure assesment was performed in accordance with Rule 17-761 or 17-762, Florida Administrative Code. Eligible Early Detection In tive (EDI) and Reimbursement Program sites do not have to perform a closure assessment.

Please Print or Type
Complete All Applicable Blanks

1. Date: 16 MAY 1994
2. DER Facility ID Number: 038518667 3. County: BAY
4. Facility Name: Coastal Systems Station, Dahlgren Division
5. Facility Owner: Department of the Navy, Commanding Officer, Coastal Systems Station
6. Facility Address: 6703 West Highway 98. Suite 126, Panama City, Florida 32407-7001
7. Mailing Address: same as above (site location: Building #9) Tank #G9
8. Telephone Number: (904) 234-4290 9. Facility Operator: Officer in Charge of Contracti
10. Are the Storage Tank(s): (Circle one or both) A. Aboveground or B. Underground
11. Type of Product(s) Stored: Petroleum (Diesel)
12. Were the Tank(s): (Circle one) A. Replaced (B.) Removed C. Closed in Place D. Upgraded (aboveground tanks o
13. Number of Tanks Closed: one 14. Age of Tanks: Unknown

Facility Assessment Information

Yes	No	Not Applicable	
☐	☒		1. Is the facility participating in the Florida Petroleum Liability Insurance and Restoration Program (FPLIRP)?
☐	☒		2. Was a Discharge Reporting Form submitted to the Department? If yes, When: Attached Where:
☒	☐		3. Is the depth to ground water less than 20 feet?
☐	☒	☐	4. Are monitoring wells present around the storage system? Temp. Monitoring wells installed If yes, specify type: ☐ Water monitoring ☐ Vapor monitoring verify groundwater conditic
☐	☒	☐	5. Is there free product present in the monitoring wells or within the excavation? Ref. Closure Report s. Earth Sciences.
☐	☒	☐	6. Were the petroleum hydrocarbon vapor levels in the soils greater than 500 parts per million for gasoline? Specify sample type: ☐ Vapor Monitoring wells ☒ Soil sample(s)
☒	☐	☐	7. Were the petroleum hydrocarbon vapor levels in the soils greater than 50 parts per million for diesel/kerose Specify sample type: ☐ Vapor Monitoring wells ☒ Soil sample(s) and monitoring wells.
☒	☐	☐	8. Were the analytical laboratory results of the ground water sample(s) greater than the allowable state target leve (See target levels on reverse side of this form and supply laboratory data sheets)
☐	☐	☒	9. If a used oil storage system, did a visual inspection detect any discolored soil indicating a release?
☐	☒		10. Are any potable wells located within ¼ of a mile radius of the facility?
☒	☐		11. Is there a surface water body within ¼ mile radius of the site? If yes, indicate distance: ±200 FT


southern earth sciences, inc.

Storage Tank Closure Assessment
COASTAL SYSTEM STATION BUILDING 9
Panama City, Florida

Southern Earth Sciences, Inc.

762 Downtowner Loop, West • Mobile, AL 36609 • (205) 344-7711
4951 Woodlane Circle • Tallahassee, FL 32303 • (904) 562-6340
416 Jenks Avenue • Panama City, FL 32401 • (904) 769-4773

Member of

AMERICAN SOCIETY OF CIVIL ENGINEERS
AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.
NATIONAL WATER WELL ASSOCIATION
AMERICAN SOCIETY FOR TESTING AND MATERIALS

southern earth sciences, inc.
Environmental Consultants

U.S. Environment & Industrial, Inc.
653 West 23rd Street #225
Panama City, FL 32405

May 2, 1994
File No. F-94-121

ATTENTION: Mr. Bill Kemp

SUBJECT: Underground Storage Tank Closure Assessment at Coastal Systems Station Building #9, Panama City, Florida

Dear Mr. Kemp:

As requested, Southern Earth Sciences, Inc. has completed a storage tank closure assessment at Coastal System Station Building #9 located in Panama City, Florida. There was one (1) 1200 gallon underground storage tank which had contained diesel fuel present on site. Tank removal was performed by KMT, Inc., of Panama City, Florida. The approximate tank location is indicated on Figure I.

On March 24, 1994, personnel with our firm mobilized to the subject site with an organic vapor analysis instrument (OVA) with a flame ionization detector (FID). Upon our arrival, excavation continued to a depth of 7.0 feet below existing grade. Areal dimensions of the excavation were approximately 8 feet (north to south) by 10 feet (east to west). No petroleum product odors were noted in the excavation or in excavated soils.

Soil samples were taken from each side and the bottom of each excavation and screened using an OVA with and without a carbon filter. Field OVA data are reported in Table I. This field testing was performed in accordance with Florida Chapter 17-770 and Comprehensive QA Plan # 920001G procedures.

Groundwater was encountered at a depth of 11.0 feet below existing grade on the date of our testing. Groundwater from a temporary well installed within the excavation was sampled on March 24, 1994, and tested for EPA 602 and 610 parameters. Results of laboratory testing are presented in the Appendix. The data are summarized in Table II. Applicable State Target Levels are also included in Table II.

It appears that Coastal System Station Building #9 property located in Panama City, Florida, has a contamination problem as defined by Florida Chapter 17-770 F.A.C. At location BLDG-9, the level of total naphthalenes (113 ppb) and PAH (48 ppb) exceeded the State Target levels of 100 ppb and 10 ppb, respectively.

All excavated soils were returned to the excavation and additional fill soils were brought in to fill the excavation. The attached Closure Assessment Form and Discharge Reporting Form should be sent, along with a copy of this report, to Mr. Wendell Reeve (Department of Health and Rehabilitative Services, (HRS), 619 North Cove Boulevard, Panama City, Florida 32401).

We appreciate the opportunity to be of service to you. Should additional information be required, please do not hesitate to contact us.

Yours Very Truly,

SOUTHERN EARTH SCIENCES, INC.

Tammie M. Corbin
Environmental Specialist

Keith E. Sibley

Keith E. Sibley, P.G.
Reg. No.: 1366
State of Florida

TMC/fp

5-2-94

ses

TABLE I

FIELD OVA DATA

SAMPLE	DEPTH (FEET)	OVA W/O FILTER (PPM)	OVA W/FILTER (PPM)	CORRECTED OVA (PPM)
B-1	3	0	0	0
	6	0	0	0
B-2	3	0	0	0
	6	0	0	0
B-3	3	0	0	0
	6	0	0	0
B-4	3	0	0	0
	6	0	0	0
B-5	7	0	0	0
	11	28	0	28
Product line				
B-6	2	0	0	0
	4	0	0	0
B-7	2	0	0	0
	4	0	0	0

PPM = parts per million

TABLE II

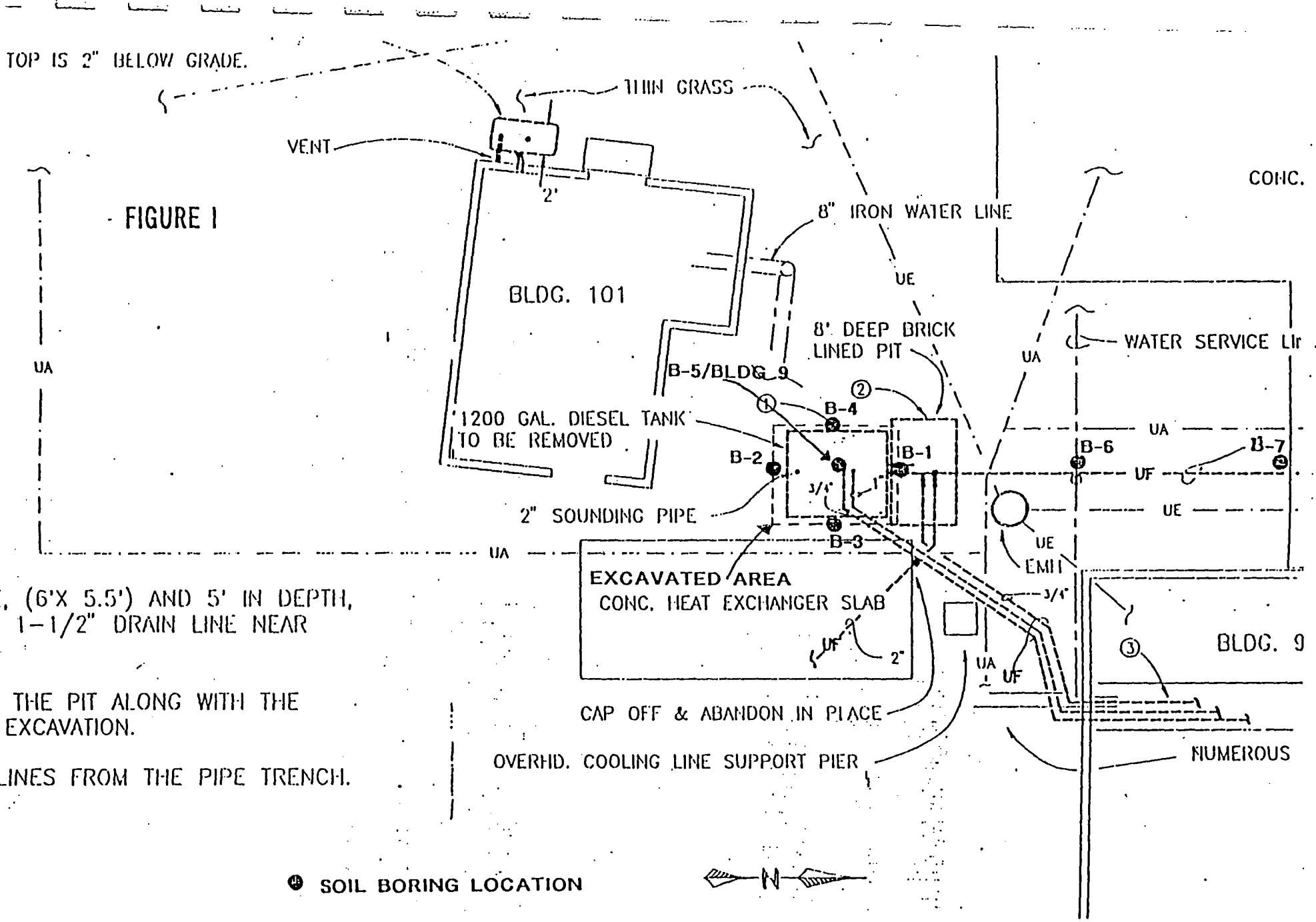
GROUNDWATER TEST RESULTS

PARAMETER	BLDG - 9 * (ALL RESULTS ARE PPB)	STATE TARGET LEVELS
BENZENE	BDL	1
TOTAL VOA	BDL	50
MTBE	BDL	50
PAH	48	10
TOTAL NAPHTHALENES	113	100

* PPB = parts per billion

BDL = Below detection level

- FIGURE 1



E, (6'X 5.5') AND 5' IN DEPTH,
D 1-1/2" DRAIN LINE NEAR

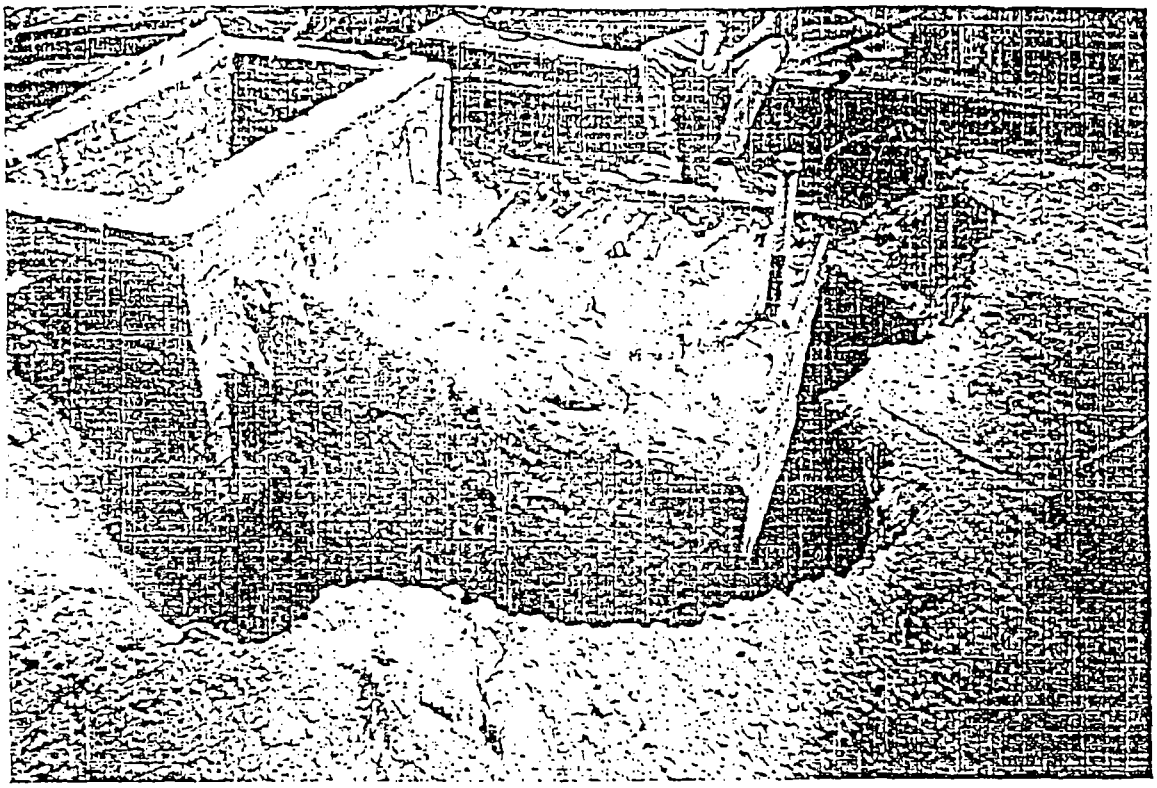
G THE PIT ALONG WITH THE
; EXCAVATION.

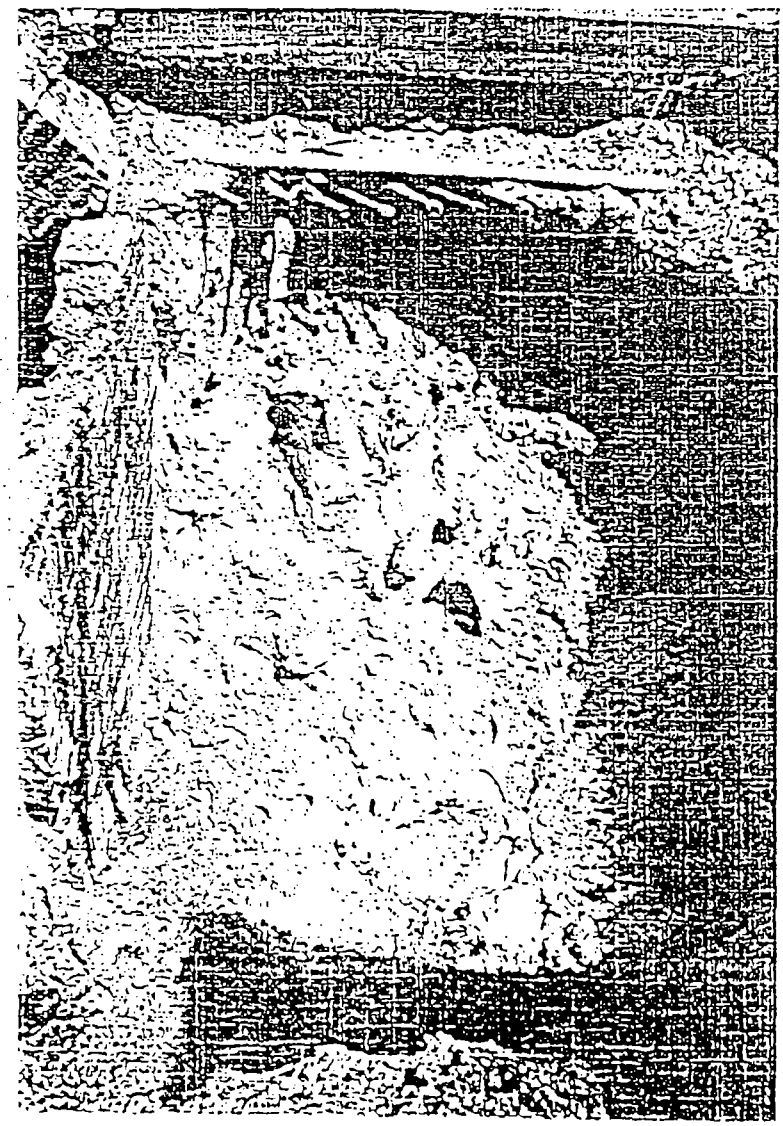
LINES FROM THE PIPE TRENCH.

BLDGS. 9 & 101 - SITE

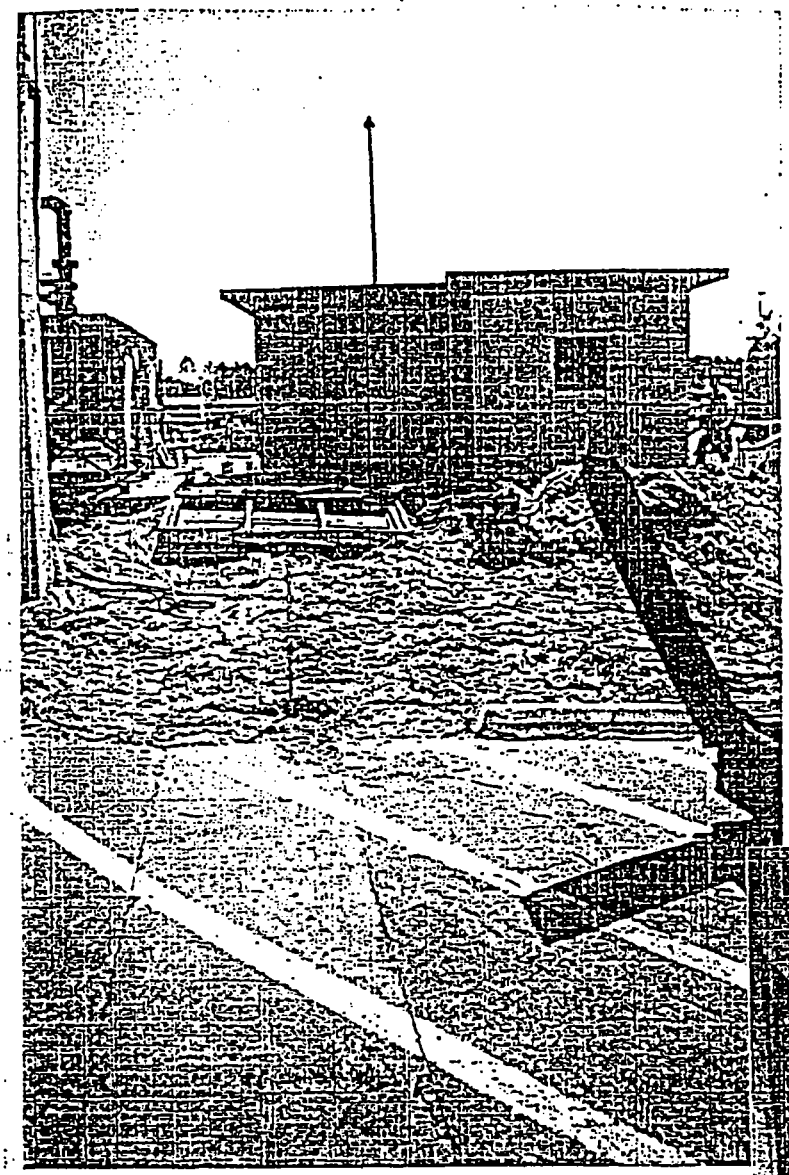
SCALE: 1/8"=1'-0"

3
1 | 2

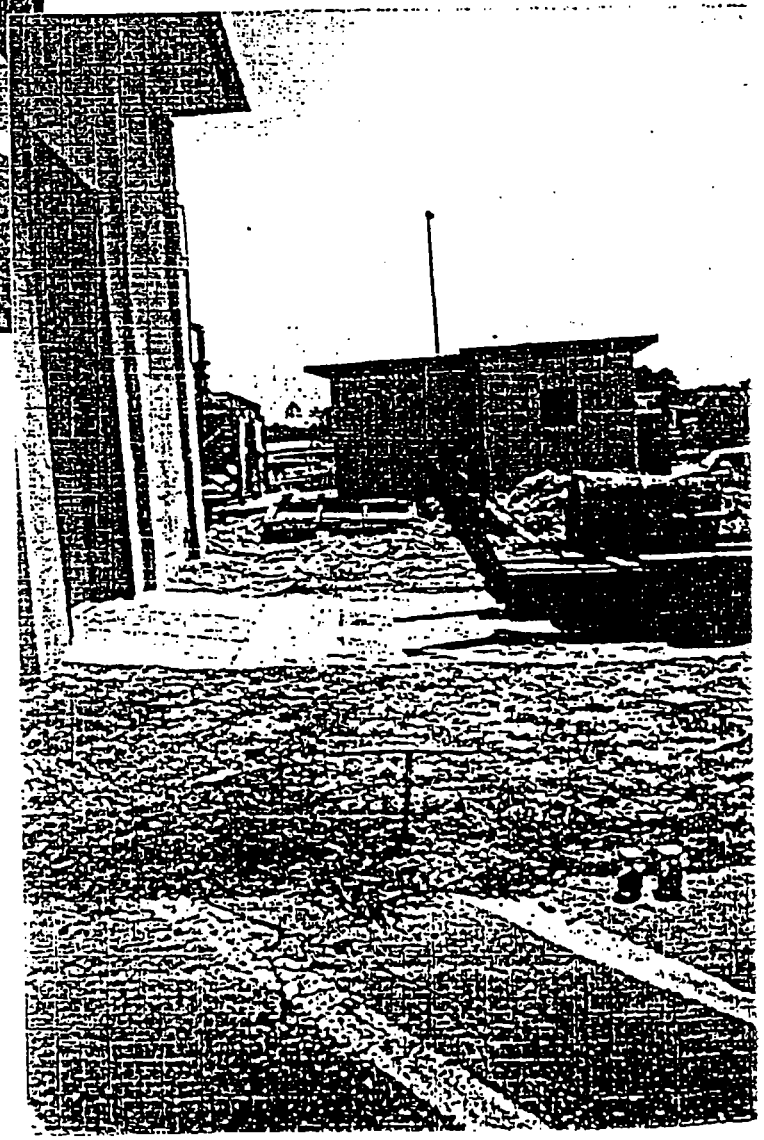




BUILDING 9



B-6



B-7

From: ENVIROCHEM, INC.
4320 MIDMOST DRIVE
POST OFFICE BOX 160012
MOBILE, ALABAMA 36616

April 8, 1994

To: SOUTHERN EARTH SCIENCES, INC.
POST OFFICE BOX 816
PANAMA CITY, FL 32402

ATTN: MR. KEITH SIBLEY

The following analytical results have been obtained for the indicated sample which was submitted to this laboratory:

Sample I.D. AA22866 Location code: 012-PC
Purchase order number: F94-101 Account code: 012
Location description: SES-PC CSS - BLDG.9
Sample collector: CLIENT/TB/TC
Sample collection date: 03/24/94 Time: 12:15
Lab submittal date: 03/25/94 Time: 13:20
Sample type: GW
Received by: BS

Parameter: (17) AROMATIC VOLATILES - 8020
Method reference: EPA 8020
Result: see below
Date started: 03/25/94 Date finished: 03/25/94
Time started: 16:45 Analyst: HL

Parameter: (17) PAH's - 8100
Method reference: EPA 8100
Result: see below
Date started: 03/29/94 Date finished: 03/29/94
Time started: 10:00 Analyst: DD

Data for (17) AROMATIC VOLATILES - 8020 ppb:

Component Name	Result	Component MDL
BENZENE	bdl	1
TOLUENE	bdl	1
CHLOROBENZENE	bdl	1
XYLENE-total	bdl	1
ETHYLBENZENE	bdl	1
1,3-DCB	bdl	1
1,4-DCB	bdl	1
1,2-DCB	bdl	1
METHYL T-BUTYL ETHER	bdl	1

Data for (17) PAH's - 8100 ppb:

Component Name	Result	Component MDL
NAPHTHALENE	bdl	30
2-METHYLNAPHTHALENE	50	25
1-METHYLNAPHTHALENE	63	25
ACENAPHTHYLENE	48	25
ACENAPHTHENE	bdl	25
FLUORENE	bdl	25
PHENANTHRENE	bdl	25
ANTHRACENE	bdl	25
FLUORANTHENE	bdl	25
PYRENE	bdl	25
BENZO(a)ANTHRACENE	bdl	25
CHRYSENE	bdl	25
BENZO(b)FLUORANTHE	bdl	25
BENZO(k)FLUORANTHE	bdl	25
BENZO(a)PYRENE	bdl	25
INDENO(123-cd)PYRE	bdl	25
DIBENZO(ah)ANTHRAC	bdl	25
BENZO(ghi)PERYLENE	bdl	25

Sample comments:

PO# 7636

If there are any questions regarding this data, please call.

Reviewed by,

Susan Dennison

Quality Assurance/Quality Control Data Package
Level I

Sample I.D. No(s): AA22865-AA22868

Method Reference: EPA 8020

Method Blank

Date Analyzed: 03/25/94 Analyst: HL

Parameters	Units	Results	Reporting Limit
BENZENE	ppb	bdl	1
TOLUENE	ppb	bdl	1
ETHYLBENZENE	ppb	bdl	1
XYLENE, total	ppb	bdl	1
METHYL T-BUTYL ETHER	ppb	bdl	1
CHLOROBENZENE	ppb	bdl	1
1,3-DICHLOROBENZENE	ppb	bdl	1
1,4-DICHLOROBENZENE	ppb	bdl	1
1,2-DICHLOROBENZENE	ppb	bdl	1
BROMOFLUOROBENZENE (Surrogate)	% REC	96	

DI Spike/Spike Duplicate

Date Analyzed: 03/26/94 Analyst: HL

Parameters	Spk Added ppb	DI Conc ppb	DI Spk Conc ppb	% Rec	DI Spk Dup Conc ppb	% Rec	% RPD	RPD Lmt	REC Lmt
BENZENE	20	<1	18.8	94	19.4	97	3	15	75-125
TOLUENE	20	<1	17.2	86	17.8	89	3	15	75-125
CHLOROBENZENE	20	<1	17.0	85	17.6	88	3	15	75-125
BROMOFLUOROBENZENE (Surrogate)				92		90	2	15	70-130

Quality Assurance/Quality Control Data Package
Level I

Sample I.D. No(s): AA22868
Method Reference: EPA 8010 Sample Type: Method Blank
Date Analyzed: 03/25/94 Analyst: HL

Parameters	Units	Results	Reporting Limit
BROMODICHLOROMETHANE	ppb	bdl	1
BROMOFORM	ppb	bdl	5
CARBON TETRACHLORIDE	ppb	bdl	1
CHLOROBENZENE	ppb	bdl	1
CHLOROETHANE	ppb	bdl	1
1CHLOROETHYL VINYL ETHER	ppb	bdl	1
CHLOROFORM	ppb	bdl	1
CHLOROMETHANE	ppb	bdl	1
DIBROMOCHLOROMETHANE	ppb	bdl	1
1,2-DICHLOROBENZENE	ppb	bdl	1
1,3-DICHLOROBENZENE	ppb	bdl	1
1,4-DICHLOROBENZENE	ppb	bdl	1
DICHLORODIFLUOROMETHANE	ppb	bdl	1
1,1-DICHLOROETHANE	ppb	bdl	1
1,2-DICHLOROETHANE	ppb	bdl	1
1,1-DICHLOROETHENE	ppb	bdl	1
T-1,2-DICHLOROETHENE	ppb	bdl	1
1,2-DICHLOROPROPANE	ppb	bdl	1
C-1,3-DICHLOROPROPENE	ppb	bdl	1
T-1,3-DICHLOROPROPENE	ppb	bdl	1
METHYLENE CHLORIDE	ppb	bdl	1
1,1,2,2TETRACHLOROETHANE	ppb	bdl	1
TETRACHLOROETHENE	ppb	bdl	1
1,1,1-TRICHLOROETHANE	ppb	bdl	1
1,1,2-TRICHLOROETHANE	ppb	bdl	1
TRICHLOROETHENE	ppb	bdl	1
TRICHLOROFLUOROMETHANE	ppb	bdl	1
VINYL CHLORIDE	ppb	bdl	1
BROMOFLUOROBENZENE (Surrogate)	% REC	84	

Quality Assurance/Quality Control Data Package
Level I

Sample I.D. No(s): AA22868

Method Reference: EPA 8010

DI Spike/Spike Duplicate

Date Analyzed: 03/26/94 Analyst: HL

Parameters	Spk Added ppb	DI Conc ppb	DI Spk Conc ppb	% Rec	DI Spk Dup Conc ppb	% Rec	% RPD	RPD Lmt	REC Lmt
CHLOROBENZENE	20	<1	17.0	85	17.6	88	3	15	75-125
1,1-DICHLOROETHENE	20	<1	20.2	101	22.4	112	10	15	75-125
TRICHLOROETHENE	20	<1	20.2	101	21.0	105	3	15	75-125
1BROMO2CHLOROPROPANE (Surrogate)				92		91	1	15	70-130

Quality Assurance/Quality Control Data Package
Level I

Sample I.D. No(s): AA22868

Prep Method Reference: EPA SW846 - 3550

Analytical Method Reference: STD METHOD 5520F

Method Blank

Analysis date: 03/31/94 **Analyst: DD**

Parameters	Units	Results	Reporting Limit
TPH	ppm	bdl	1

Matrix Spike/Duplicate

Date Started: 03/31/94 **Analyst: DD**

Parameters	Spk Added ppm	Sample Conc ppm	Spk Conc ppm	% Rec	Dup Sample Conc ppm	% RPD	RPD Lmt	REC Lmt
TPH SPIKE	9.8	<1	11	113		-	20	75-125
TPH SPIKE DUP	8.0	<1	8.8	110		3	20	75-125

Quality Assurance/Quality Control Data Package
Level I

Sample I.D. No(s): AA22866-AA22867

Method Reference: EPA 8100

Sample Type: Method Blank

Date Extracted: 03/29/94 **Analyst: DD**

Date Analyzed: 03/30/94

Parameters	Units	Results	Reporting Limit
NAPHTHALENE	ppb	bdl	5
2-METHYLNAPHTHALENE	ppb	bdl	5
1-METHYLNAPHTHALENE	ppb	bdl	5
ACENAPHTHYLENE	ppb	bdl	5
ACENAPHTHENE	ppb	bdl	5
FLUORENE	ppb	bdl	5
PHENANTHRENE	ppb	bdl	5
ANTHRACENE	ppb	bdl	5
FLUORANTHENE	ppb	bdl	5
PYRENE	ppb	bdl	5
BENZO (a) ANTHRACENE	ppb	bdl	5
CHRYSENE	ppb	bdl	5
BENZO (b) FLUORANTHENE	ppb	bdl	5
BENZO (k) FLUORANTHENE	ppb	bdl	5
BENZO (a) PYRENE	ppb	bdl	5
INDENO (1,2,3 cd) PYRENE	ppb	bdl	5
DIBENZO (ah) ANTHRACENE	ppb	bdl	5
BENZO (ghi) PERYLENE	ppb	bdl	5
2-FLUOROBIPHENYL (Surrogate)	%REC	99	

Quality Assurance/Quality Control Data Package
Level I

Sample I.D. No(s): AA22866-AA22867

Method Reference: EPA 8100

DI Spike/Spike Duplicate

Date Extracted: 03/29/94

Date Analyzed: 03/30/94 Analyst: DD

Parameters	Spk Added ppb	DI Conc ppb	DI Spk Conc ppb	% Rec	DI Spk Dup Conc ppb	% Rec	% RPD	RPD Lmt	REC Lmt
NAPHTHALENE	100	<5	99	99	103	103	4	25	35-125
ACENAPHTHENE	100	<5	91	91	89	89	2	25	75-125
FLUORANTHENE	100	<5	105	105	109	109	4	25	70-130
PYRENE	100	<5	93	93	88	88	6	25	70-130
BENZO(a)PYRENE	100	<5	69	69	53	53	26	25	70-130
2-FLUOROBIPHENYL (Surrogate)				107		90	17	25	50-150

QUALITY CONTROL DATA
Comment: AA22868 UNITS = ppm

DATE ANALYZED	ANALYST	ANALYTE	METHOD	BLANK RESULT	DI SPK RESULT	DI SPK AMOUNT	SAMPLE RESULT	DUP RESULT	DI SPK % REC	DUP RPD	RPD LIMITS	% REC LIMITS
04/18/94	AL	AS	7060L	<0.01	0.031	0.03	<0.01	<0.01	103	0	20	75-125
04/20/94	AL	CD	7131L	<0.002	0.464	0.500	0.037	0.037	93	0	20	75-125
04/20/94	AL	PB	7421L	<0.005	0.032	0.03	<0.005	<0.005	107	0	20	75-125
04/20/94	AL	CR	7191L	<0.01	0.509	0.500	<0.01	<0.01	102	0	20	75-125

	Spike Sample	Spike Duplicate Sample
File ID :	MAR31-3.D	MAR31-4.D
Sample :	spike22825	spike dup22825
Acq Time:	31 Mar 94 4:18 pm	31 Mar 94 4:55 pm

Compound	Sample Conc	Spike Added	Spike Res	Dup Res	Spike %Rec	Dup %Rec	RPD	QC Limits RPD	QC Limits % Rec
Phenol	0.1	75	15	15	19	20	3	35	5-112
2-Chlorophenol	0.1	75	45	55	60	73	20	35	23-134
1,4-Dichlorobenzene	0.1	50	18	20	36	40	11	35	20-124
n-Nitroso-di-n-propy	0.0	50	36	41	73	81	11	35	0-230
1,2,4-Trichlorobenze	0.0	50	24	25	48	51	6	35	44-142
4-Chloro-3-methylphe	0.0	75	46	51	61	68	11	35	22-147
Acenaphthene	0.0	50	19	27	39#	54	33	35	47-145
4-Nitrophenol	0.0	75	15	18	20	25	23	35	0-132
2,4-Dinitrotoluene	0.0	50	31	33	63	67	6	35	39-139
Pentachlorophenol	0.0	75	48	55	64	73	14	35	14-136
Pyrene	0.0	50	27	31	55	61	12	35	52-115

8270B.M Thu Mar 31 17:49:30 1994 GC/MS-1

NT Southern Earth Sciences DATE 3-24-94 PAGE 1 OF 1
RESS 416 Jenks Ave SAMPLER T. Barnes / Cuip METHOD OF SHIPMENT Bus
/STATE/ZIP Panama City FL 32401 PROJECT NAME/LOCATION CSS
TACT Keith Silley PHONE NO. (904) 769-4773 PROJECT NO./PO# F94-101 / 7636

iroChem, Inc. 4320 Midmost Dr. Mobile, AL 36609 (205) 344-9106
s and Analytical Laboratories

NO.	FIELD I.D.	Grab	Composite	Matrix	DATE	TIME	REQUIRED ANALYSES	602 XMTBE		610	625	601+602	Acid	Lead	TRPH
							PARAMETER / BOTTLE / LOT # / PRESERVATIVE / DISPOSAL								
65	Bldg 101	X		GW	3-24	10:30		X							
66	Bldg 9	X		GW	3-24	12:15		X		X					
67	Bldg 110	X		GW	3-24	1:00		X		X					
68	Bldg 240	X		GW	3-24	1:45					X	X	X		X

r # Sample Kit Information

Prepared by:

	Date	Time		Date	Time
uished by [signature]	3-24-94	2:30	Received by [signature]	3/25/94	13:15
uished by [signature]	3/25/94	13:20	Received by D. Sellrance	3/25/94	13:20

onts 10 day UST Turnaround Needed

602 + X + MTBE

ENVIROCHEM, INC. 2053419492 P.02

ENVIROCHEM, INC.
INITIAL CHECK OF SAMPLES AND DOCUMENTATION

DATE 4/29/94 TIME 1200 RECEIVER BS

CLIENT SES-PC Gran CLIENT PROJECT NO. [illegible] F-94-143 POFF-7671

LABORATORY LOG NUMBER(S) A1A24078 (Concrete)

SAMPLE CONTAINERS:

Were any containers cracked, broken, or leaking? YES NO

Was there evidence of grossly contaminated container exteriors or shipping cooler interiors? YES NO

Were bubbles or headspace found in VOC containers? YES NO

Were samples collected in proper containers? YES NO

DOCUMENTATION:

Was the chain-of-custody complete and signed? YES NO

Did sample identifications on chain-of-custody correspond to container label identifications? YES NO

Does documentation indicate that hold times have not been exceeded? YES NO

PRESERVATION:

Does documentation indicate samples contain proper chemical preservatives? YES NO

Are samples in contact with wet ice? YES NO

Temperature of wet ice ______

Samples are __/__ accepted ______ rejected

REJECTION DOCUMENTATION:

List reasons ______

______

Client contacted ______ (name)

______ (date)

Client instructions ______ proceed ______ terminate

ENVIROCHEM, INC.
INITIAL CHECK OF SAMPLES AND DOCUMENTATION

DATE 4/29/94 TIME 1300 RECEIVER BS

CLIENT SES-PC (Ellen Marshal) CLIENT PROJECT NO. F94-175

LABORATORY LOG NUMBER(S) AA24103-129

SAMPLE CONTAINERS:

Were any containers cracked, broken, or leaking?	YES	(NO)
Was there evidence of grossly contaminated container exteriors or shipping cooler interiors?	YES	(NO)
Were bubbles or headspace found in VOC containers?	YES	(NO) N/A
Were samples collected in proper containers?	(YES)	NO

DOCUMENTATION:

Was the chain-of-custody complete and signed?	(YES)	NO
Did sample identifications on chain-of-custody correspond to container label identifications?	(YES)	NO
Does documentation indicate that hold times have not been exceeded?	(YES)	NO

PRESERVATION:

Does documentation indicate samples contain proper chemical preservatives?	YES	(NO)
Are samples in contact with wet ice?	YES	(NO)

Temperature of wet ice _____

Samples are ✓ accepted _____ rejected

REJECTION DOCUMENTATION:

List reasons _____

_____

Client contacted _____ (name)

_____ (date)

Client instructions _____ proceed _____ terminate.

APPENDIX E

SOIL BORING LOGS

BROWN & ROOT ENVIRONMENTAL

LOG OF BORING

SHEET 1 OF 1

LOCATION OF BORING:

See Soil Boring Location Map

PROJECT: CTO 0008 Site 69		BORING NO. SB01	
		TOTAL DEPTH: 9'	
JOB NO.	7113	LOGGED BY: G. Goode	
PROJ.MGR:	G. Goode	EDITED BY: G. Goode	
DRILLING CONTRACTOR:	NA		
DRILL RIG TYPE:	NA		
DRILLER'S NAME	NA		
SAMPLING METHODS:	Hand Auger		
STARTED TIME:	17:00	DATE:	6/12/96
COMPLETED TIME:	17:20	DATE:	6/12/96
BORING DEPTH (ft.)	9'		
CASING DEPTH (ft.)	NA		
WATER DEPTH (ft.)	—		

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS CODE	SOIL/SEDIMENT DESCRIPTION
1										1		
2	HA	—	—	—	Dry	—	Z	ND	Z	2	SP	Sand, light brown, Fine to medium grained quartz, less than 5% Fines, loose dry
3										3		
4	HA	—	—	—	Dry	—	Z	ND	Z	4	SP	Sand, light brown, as above with some organic root matter
5										5		
6	HA	—	—	—	moist	—	Z	ND	Z	6	SP	Sand, yellowish Orange, Fine to medium grained quartz, less than 5% Fines, loose, moist
7										7		
8	HA	—	—	—	wet	—	ND	NS	ND	8	SP	Sand, yellowish Orange, Fine to medium grained quartz, less than 5% Fines, loose, wet at 8.5' — Auger Refusal at 9'
9										9		

ND = NO ORGANIC VAPORS DETECTED

NS = NO CARBON FILTERED SAMPLE READ

BROWN & ROOT ENVIRONMENTAL

LOG OF BORING

SHEET 1 OF 1

LOCATION OF BORING:

See Soil Boring Location Map

PROJECT: CTO 0008 Site G9		BORING NO.	SB02
		TOTAL DEPTH:	10.5
JOB NO.	7113	LOGGED BY:	G. Goode
PROJ.MGR:	G. Goode	EDITED BY:	G. Goode
DRILLING CONTRACTOR:	NA		
DRILL RIG TYPE:	NA		
DRILLER'S NAME	NA		
SAMPLING METHODS:	Hand Auger		
STARTED TIME:	17:20	DATE:	6/12/96
COMPLETED TIME:	17:30	DATE:	6/12/96
BORING DEPTH (ft.)	10.5'		
CASING DEPTH (ft.)	NA		
WATER DEPTH (ft.)	—		

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS CODE	SOIL/SEDIMENT DESCRIPTION
1										1		
2	HA	—	—	—	Dry	—	ND	NS	ND	2	SP	Sand, light brown, fine to medium grained quartz, less than 5% fines, loose, dry
3										3		
4	HA	—	—	—	Dry	-	2	ND	2	4	SP	Sand, light brown, fine to medium grained quartz, less than 5% fines, some organics, loose dry
5										5		
6	HA	—	—	—	Dry	-	ND	NS	ND	6	SP	Sand, light brown, fine to medium grained quartz, less than 5% fines, loose, dry
7										7		
8	HA	—	—	—	moist	-	ND	NS	ND	8	SP	Sand, white fine to medium grained quartz, very clean, less than 5% fines, loose, moist
9										9		
10	HA	—	—	—	wet		2	ND	2	*	SP	Sand, white, as above, wet at 10.5'

ND = NO ORGANIC VAPORS DETECTED

NS = NO CARBON FILTERED SAMPLE READ

BROWN & ROOT ENVIRONMENTAL

LOG OF BORING

SHEET 1 OF 1

LOCATION OF BORING:

See Soil Boring location Map

PROJECT: CTO 0008. Site 69		BORING NO. SB03	
		TOTAL DEPTH: 10.5'	
JOB NO.	7113	LOGGED BY: G. Goode	
PROJ.MGR:	G. Goode	EDITED BY: G. Goode	
DRILLING CONTRACTOR:	NA		
DRILL RIG TYPE:	NA		
DRILLER'S NAME	NA		
SAMPLING METHODS:	Hand Auger		
STARTED TIME:	19:09	DATE: 6/12/96	
COMPLETED TIME:	19:25	DATE: 6/12/96	
BORING DEPTH (ft.)	10.5'		
CASING DEPTH (ft.)	NA		
WATER DEPTH (ft.)	—		

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS CODE	SOIL/SEDIMENT DESCRIPTION
1										1		
2	HA	—	—	—	Dry	—	ND	NS	ND	2	SP	Sand, light brown, fine to medium grained quartz, less than 5% fines, loose dry
3										3		
4	HA	—	—	—	Dry	—	ND	NS	ND	4	SP	Sand, light brown, as above
5										5		
6	HA	—	—	—	Dry	—	ND	NS	ND	6	SP	Sand, white, fine to medium grained quartz, very clean, loose, dry
7										7		
8	HA	—	—	—	moist	—	ND	NS	ND	8	SP	Sand, white, as above, moist
9										9		
10	HA	—	—	—	wet	—	ND	NS	ND	X	SP	Sand, white, fine to medium grained quartz, very clean, wet at 10.5'

ND = NO ORGANIC VAPORS DETECTED

NS = NO CARBON FILTERED SAMPLE READ

BROWN & ROOT ENVIRONMENTAL

LOG OF BORING

SHEET 1 OF 1

LOCATION OF BORING:

See Soil Boring Location Map

PROJECT: CTO 0008 site 69		BORING NO. SB04	
		TOTAL DEPTH: 6.5'	
JOB NO.	7113	LOGGED BY: G. Goode	
PROJ.MGR:	G. Goode	EDITED BY: G. Goode	
DRILLING CONTRACTOR:	NA		
DRILL RIG TYPE:	NA		
DRILLER'S NAME	NA		
SAMPLING METHODS:	Hand Auger		
STARTED TIME:	11:15	DATE: 6/13/96	
COMPLETED TIME:	11:30	DATE: 6/13/96	
BORING DEPTH (ft.)	6.5'		
CASING DEPTH (ft.)	NA		
WATER DEPTH (ft.)	—		

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS CODE	SOIL/SEDIMENT DESCRIPTION
1										1		
2	HA	—	—	—	Dry	—	ND	NS	ND	2	SP	Sand, light brown, fine to medium grained quartz, less than 5% fines, loose, dry
3										3		
4	HA	—	—	—	Dry	—	ND	NS	ND	4	SP	Sand, light brown, fine to medium grained quartz, less than 5% fines, loose, dry
5										5		
6	HA	—	—	—	Dry	—	ND	NS	ND	6	SP	Sand, light brown, fine to medium grained quartz, less than 5% fines, loose dry
										7		Auger Refusal at 6.5'
										8		
										9		

ND = NO ORGANIC VAPORS DETECTED

NS = NO CARBON FILTERED SAMPLE READ

BROWN & ROOT ENVIRONMENTAL

LOG OF BORING

SHEET 1 OF 1

LOCATION OF BORING:

See Soil Boring Location Map

PROJECT: CTO 0008 Site G9		BORING NO. SB05
		TOTAL DEPTH: 9
JOB NO.	7113	LOGGED BY: G. Goode
PROJ.MGR:	G. Goode	EDITED BY: G. Goode
DRILLING CONTRACTOR:	NA	
DRILL RIG TYPE:	NA	
DRILLER'S NAME	NA	
SAMPLING METHODS:	Hand Auger	
STARTED TIME:	13:40	DATE: 6/13/96
COMPLETED TIME:	14:00	DATE: 6/13/96
BORING DEPTH (ft.)	9	
CASING DEPTH (ft.)	NA	
WATER DEPTH (ft.)	—	

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS CODE	SOIL/SEDIMENT DESCRIPTION
1										1		
2	HA	—	—	—	dry	—	ND	NS	ND	2	SP	Sand, yellowish Orange, fine to medium grained quartz, less than 5% fines, loose, dry
3										3		
4	HA	—	—	—	moist	—	ND	NS	ND	4	SP	Sand, light brown, fine to medium grained quartz, less than 5% fines, loose, moist
5										5		
6	HA	—	—	—	moist	—	ND	NS	ND	6	SP	Sand, White, fine to medium grained quartz, less than 5% fines, loose, moist
7										7		
8	HA	—	—	—	wet	—	ND	NS	ND	8	SP	Sand, light brown, fine to medium grained quartz, less than 5% fines, wet at 8.5'
9										9		

ND = NO ORGANIC VAPORS DETECTED

NS = NO CARBON FILTERED SAMPLE READ

BROWN & ROOT ENVIRONMENTAL

LOG OF BORING

SHEET 1 OF 1

LOCATION OF BORING:

See Soil Boring Location Map

PROJECT:	CTO 0008 Site 69	BORING NO.	69 TW01
		TOTAL DEPTH:	15.0'
JOB NO.	7113	LOGGED BY:	G. Helms
PROJ.MGR:	G. Goode	EDITED BY:	
DRILLING CONTRACTOR:	NA		
DRILL RIG TYPE:	NA		
DRILLER'S NAME	NA		
SAMPLING METHODS:	Hand auger		
STARTED TIME:	1430	DATE:	6/14/96
COMPLETED TIME:	1458	DATE:	6/14/96
BORING DEPTH (ft.)	15.0'		
CASING DEPTH (ft.)	NA		
WATER DEPTH (ft.)	—		

	SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS CODE	SOIL/SEDIMENT DESCRIPTION
1											1		
2		HA	—	—	—	moist	—	0	0	0	2		SAND, lt. brn, fg-mg qtz., well graded, moist.
3											3		
4		HA	—	—	—	moist	—	0	0	0	4		SAND, lt brn., fg-mg predominantly mg, qtz. poorly graded; little - no fines, moist.
5		SS	2/3	12	12	moist	—	0	0	0	5		5.0'-6.0' - SAND as above.
6											6		8.0'-10.0' - SAND, lt brn, to 8.5' then gray, fg-mg Some silt, below 8.5' well graded qtz. then more silt. Wet at 8.0'.
7											7		
8											8		* Drilled on to 15.0' + set a well.
9		SS	3/3	24	12	WET	—	NA	NA	NA	9		
			4/3										

ND = NO ORGANIC VAPORS DETECTED

NS = NO CARBON FILTERED SAMPLE READ

* Permit T9661499

BROWN & ROOT ENVIRONMENTAL

LOG OF BORING

SHEET 1 OF 1

LOCATION OF BORING: See soil boring Location Map	PROJECT: CTO 0008 Site 69/7113	BORING NO. 69-TW02
		TOTAL DEPTH: 15.0'
	JOB NO. 7113	LOGGED BY: G. Helms
	PROJ.MGR: G. Goode	EDITED BY:
	DRILLING CONTRACTOR: Groundwater Protection	
	DRILL RIG TYPE: D120C (Diedrick)	
	DRILLER'S NAME Charles Bucher	
	SAMPLING METHODS: ~~HSA~~ Split Spoon	
	STARTED TIME: 1614	DATE: 6/13/96
	COMPLETED TIME: 1651	DATE: 6/13/96
	BORING DEPTH (ft.) 15.0'	
	CASING DEPTH (ft.)	
	WATER DEPTH (ft.) —	

	SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS CODE	SOIL/SEDIMENT DESCRIPTION
1											1		
2	HA	—	—	—	moist	—	0	0	0	2		SAND, brn., fg-mg qtz. well graded, moist
3											3	SW	
4	HA	—	—	—	moist	—	0	0	0	4		SAND, brn. as above; moist.
5	SS	4/3	12"	12"	moist	—	0	0	0	5	SW	SAND, lt. tan, fg poorly graded, qtz., moist.
6										6		
7										7		
8	SS									8		
9	SS	6/8	24"	12"	WET	—	0	0	0	9	SW	SAND, fg-mg, lt. tan to ~8.6 then some silt, well graded
10		7/8										* Boring extended to 15.0' for well.

ND = NO ORGANIC VAPORS DETECTED

NS = NO CARBON FILTERED SAMPLE READ

* Permit # 9601500

BROWN & ROOT ENVIRONMENTAL

LOG OF BORING

SHEET 1 OF 1

LOCATION OF BORING:

See Soil boring location Map

PROJECT: NCSS CTO 0008 Site 69		BORING NO. 69-TW03	
		TOTAL DEPTH:	
JOB NO.	7113	LOGGED BY: G. Helms	
PROJ.MGR:	G Goode	EDITED BY:	
DRILLING CONTRACTOR:	NA		
DRILL RIG TYPE:	NA		
DRILLER'S NAME	NA		
SAMPLING METHODS:	hand auger		
STARTED TIME:	0725	DATE:	6/14/96
COMPLETED TIME:	0836	DATE:	6/14/96
BORING DEPTH (ft.)			
CASING DEPTH (ft.)			
WATER DEPTH (ft.)	—		

SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS CODE	SOIL/SEDIMENT DESCRIPTION
1										1		Hand augered this location due to lines in the area.
2	HA	-	-	-	moist	-	0	0	0	2		
3										X 3 X	SW	SAND, mg-fg, buff colored, predominantly qtz., well graded, moist.
4	HA	-	-	-	moist	-	0	0	0	4		
5										X 5 X	SP	SAND, reddish brn; fg-mg, predominantly qtz.; predominantly med grains, poorly graded, moist
6										6		
7	HA	-	-	-	moist	-	0	0	0	7 X	SW	SAND, buff colored, fg-mg predominantly qtz.; well graded, moist.
8										8		
9										9		
10												

ND = NO ORGANIC VAPORS DETECTED

NS = NO CARBON FILTERED SAMPLE READ

Permit # T-9601501

BROWN & ROOT ENVIRONMENTAL

LOG OF BORING

SHEET 1 OF 1

LOCATION OF BORING:

see soil boring location Map

PROJECT: CTO - 0008 Site # G9		BORING NO. PC4-G9-MW01	
		TOTAL DEPTH: 15.0'	
JOB NO.	7113	LOGGED BY: G. Helms	
PROJ.MGR:	G. Goode	EDITED BY:	
DRILLING CONTRACTOR:	Ground Water Protection		
DRILL RIG TYPE:	D120 (Diedrick)		
DRILLER'S NAME	Charles Bucher		
SAMPLING METHODS:	Hand auger / split spoon		
STARTED TIME:	1523	DATE:	6/13/96
COMPLETED TIME:	1609	DATE:	6/13/96
BORING DEPTH (ft.)			
CASING DEPTH (ft.)	—		
WATER DEPTH (ft.)	—		

	SAMPLE DEPTH	SAMPLER TYPE	BLOWS/6-IN.	INCHES DRIVEN	INCHES RECOVERED	MOISTURE	ODOR	UNFILTERED OVA (PPM)	FILTERED OVA (PPM)	CORRECTED OVA (PPM)	DEPTH IN FEET	USCS CODE	SOIL/SEDIMENT DESCRIPTION
1											1		
2	HA	—	—	—	moist	—	0	0	0	2			SAND - brn., fg-mg, predominantly qtz., some silt, moist, well graded.
3											3	SW	
4	HA	—	—	—	moist	—	0	0	0	4			SAND, brn., fg-mg, some silt, well graded, moist.
5											5	SW	
6	SS	1/1	12"	12"	moist	—	3	1	2	6			SAND, - brn. as above with some silt, moist
7											7		
8											8		
9	SS	3/5	24"	3"	WET	—	40	14	26	9	SW		SAND - As above, wet, but has a strong diesel like odor.
10		4/6											* Drilled from 8.0' - 15.0' to set a well. Cuttings had a strong diesel like odor.

ND = NO ORGANIC VAPORS DETECTED

NS = NO CARBON FILTERED SAMPLE READ

SOIL/SEDIMENT DESCRIPTION

APPENDIX F

HEADSPACE METHODOLOGY FOR DETERMINING SOIL ORGANIC VAPOR CONCENTRATIONS

HEADSPACE METHODOLOGY FOR DETERMINING SOIL ORGANIC VAPOR CONCENTRATION

Soil headspace readings where obtained utilizing the following method which conforms to the requirements of Rule 62-770.200(2), FAC.

Two 16 ounce glass soil jars were half-filled with soil sample (duplicate samples). The soil jars were then sealed utilizing "mason jar" type open top screw on caps with foil in place of the conventional solid jar tops. The soil samples were allowed to equilibrate to ambient temperature which was within the FDEP temperature range.

The samples were tested with a Foxboro Century 128, an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). Prior to each days activities, the OVA was field calibrated with 100 ppm methane in air, in accordance with the manufacturers specifications. Sample testing was performed by inserting the OVA probe through the foil sample cover and recording the highest OVA reading. Following collection of this OVA reading, the OVA was fitted with a granular activated carbon filter probe. The OVA was then used to test the headspace above the duplicate sample. Carbon absorbs petroleum hydrocarbons and thus the filtered reading is assumed to represent naturally occurring organic vapors.

Upon completion of the screening exercise, the carbon filtered result was subtracted from the un-filtered result, to obtain a net petroleum vapor value. In accordance with Rule 17(62)-770.200(2), F.A.C., and Guidelines for Assessment and Remediation of Petroleum Contaminated Soil (May 1994) corrected headspace levels in excess of 50 ppm is defined as excessively contaminated soil for diesel contaminated soil. Corrected headspace levels in excess of 10 ppm but less than 50 ppm are considered as contaminated, though not excessively contaminated.

APPENDIX G

WELL COMPLETION LOGS

WELL COMPLETION LOG

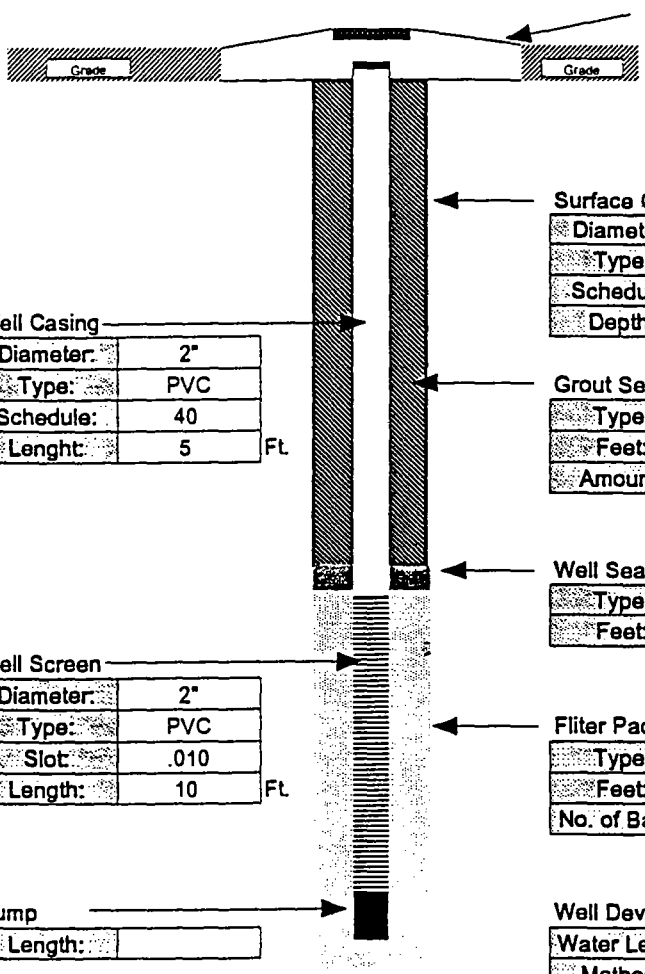
Water Mgmt. Dist.: NWFWMD
Permit Number:

Work Order: 6028
Type of Well: Monitor
Well Number: PCYG9MW01
Method Used: 4¼" HSA
Borehole Dia. 8"

Site Information:
Name: CSS Panama City - Phase 1
Address: Site G9, 323 and 333
C,S,Z: Panama City, Florida
S/T/R:

Client / Consultant Information
Consultant: Brown & Root
Field Rep: Gerry Goode

Well Diameter	Well Type	Well Depth	Screen Length	Casing Length	Bags Grout	Sand Bags/Weight	Filter Type	Well Seal
2"	PVC	15	10	5	0.5	8/50lb	20/30	Bentonite
40 ←	Schedule	Slot Size: →	.010		2	← Feet →	12	1



Surface Completion
Bolt Down

Surface Casing

Diameter:	
Type:	
Schedule:	
Depth:	

Intermediate Casing

Diameter:	
Type:	
Schedule:	
Depth:	

Well Casing

Diameter:	2"
Type:	PVC
Schedule:	40
Lenght:	5 Ft.

Grout Seal

Type:	II Portland
Feet:	2
Amount:	0.5 Bags

Well Seal

Type:	Bentonite
Feet:	1

Well Screen

Diameter:	2"
Type:	PVC
Slot:	.010
Length:	10 Ft.

Fliter Pack

Type:	20/30
Feet:	12
No. of Bags:	8/50lb

Sump

Length:	

Well Development

Water Level:	8'		
Method:	Honda		
Start: →	Dark	Finish: →	Clear
Time:			
GPM:			

Contractor Information

Contractor #:	2633
Completion:	06/13/96
Driller:	Charles Bucher
Lead Hand:	Scott Robinson
3rd Man:	Todd Flick
Drill Rig:	D120C

Company: Groundwater Protection, Inc.
Address: 4315 S.W. 34th Street
C,S,Z: Orlando, Florida 32811
Phone/FAX: (407) 426-7885 / (407) 426-7586

WELL COMPLETION LOG

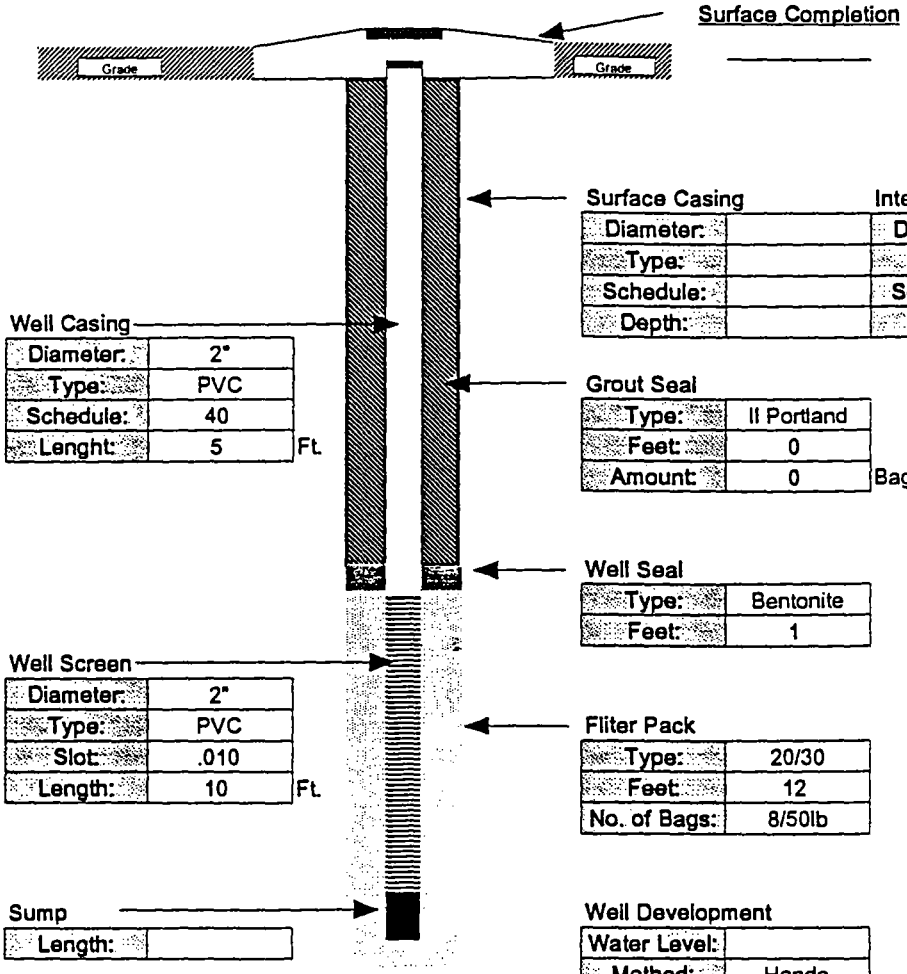
Water Mgmt. Dist.: NWFWMD
Permit Number:

Work Order: 6028
Type of Well: Monitor
Well Number: G9TW01
Method Used: 4¼" HSA
Borehole Dia. 8"

Site Information:
Name: CSS Panama City - Phase 1
Address: Site G9, 323 and 333
C,S,Z: Panama City, Florida
S/T/R:

Client / Consultant Information
Consultant: Brown & Root
Field Rep: Gerry Goode

Well Diameter	Well Type	Well Depth	Screen Length	Casing Length	Bags Grout	Sand Bags/Weight	Filter Type	Well Seal
2"	PVC	15	10	5		8/50lb	20/30	Bentonite
40	← Schedule	Slot Size: →	.010			← Feet →	12	1



Surface Casing

Diameter:	
Type:	
Schedule:	
Depth:	

Intermediate Casing

Diameter:	
Type:	
Schedule:	
Depth:	

Well Casing

Diameter:	2"
Type:	PVC
Schedule:	40
Lenght:	5 Ft.

Grout Seal

Type:	II Portland
Feet:	0
Amount:	0 Bags

Well Seal

Type:	Bentonite
Feet:	1

Well Screen

Diameter:	2"
Type:	PVC
Slot:	.010
Length:	10 Ft.

Fliter Pack

Type:	20/30
Feet:	12
No. of Bags:	8/50lb

Sump

Length:	

Well Development

Water Level:			
Method:	Honda		
Start: →	Dark	Finish: →	Clear
Time:	1 Hour		
GPM:			

Contractor Information

Contractor #:	2633
Completion:	06/13/96
Driller:	Charles Bucher
Lead Hand:	Scott Robinson
3rd Man:	Todd Flick
Drill Rig:	D120C

Company: Groundwater Protection, Inc.
Address: 4315 S.W. 34th Street
C,S,Z: Orlando, Florida 32811
Phone/FAX: (407) 426-7885 / (407) 426-7586

WELL COMPLETION LOG

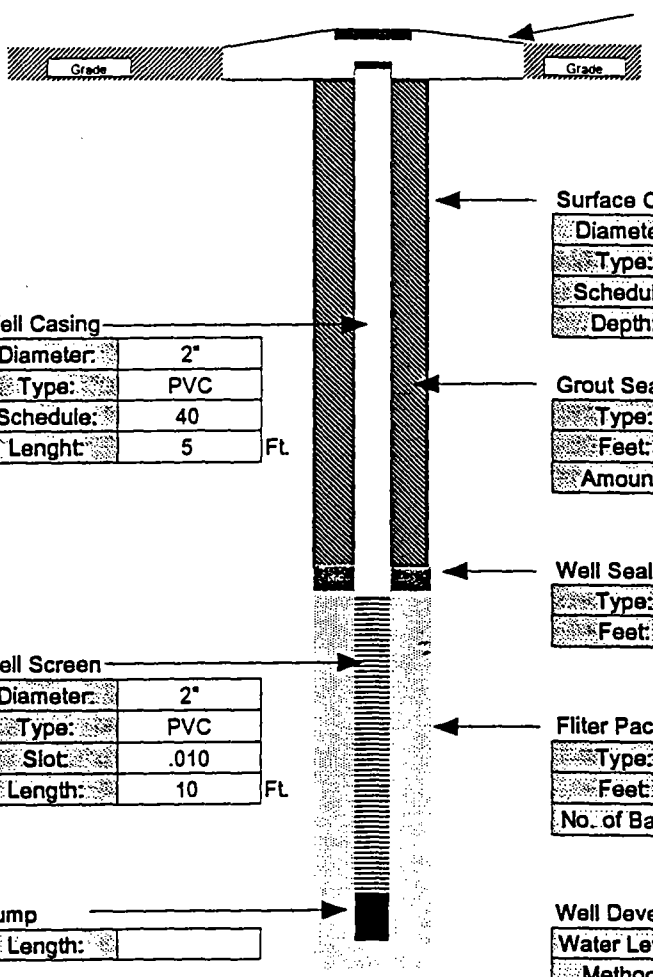
Water Mgmt. Dist.: NWFWMD
Permit Number:

Work Order: 6028
Type of Well: Monitor
Well Number: G9TW02
Method Used: 4¼" HSA
Borehole Dia. 8"

Site Information:
Name: CSS Panama City - Phase 1
Address: Site G9, 323 and 333
C,S,Z: Panama City, Florida
S/T/R:

Client / Consultant Information
Consultant: Brown & Root
Field Rep: Gerry Goode

Well Diameter	Well Type	Well Depth	Screen Length	Casing Length	Bags Grout	Sand Bags/Weight	Filter Type	Well Seal
2"	PVC	15	10	5		7/50lb	20/30	Bentonite
40 ←	Schedule	Slot Size: →	.010			← Feet →	12	1



Surface Completion

Surface Casing

Diameter:	
Type:	
Schedule:	
Depth:	

Intermediate Casing

Diameter:	
Type:	
Schedule:	
Depth:	

Well Casing

Diameter:	2"
Type:	PVC
Schedule:	40
Lenght:	5 Ft.

Grout Seal

Type:	II Portland
Feet:	0
Amount:	0 Bags

Well Seal

Type:	Bentonite
Feet:	1

Well Screen

Diameter:	2"
Type:	PVC
Slot:	.010
Length:	10 Ft.

Fliter Pack

Type:	20/30
Feet:	12
No. of Bags:	7/50lb

Sump

Length:	

Well Development

Water Level:		
Method:	Honda	
Start: →	Dark	Finish: →
Time:		
GPM:		

Contractor Information

Contractor #:	2633
Completion:	06/13/96
Driller:	Charles Bucher
Lead Hand:	Scott Robinson
3rd Man:	Todd Flick
Drill Rig:	D120C

Company: Groundwater Protection, Inc.
Address: 4315 S.W. 34th Street
C,S,Z: Orlando, Florida 32811
Phone/FAX: (407) 426-7885 / (407) 426-7586

APPENDIX H

FIELD MEASUREMENTS AND SAMPLING FORMS

BRE Project No: 7113 | Date: | Sampler(s): C. Burgin

Client Site ID: G9 | Facility Address: Naval Coastal System Station PCY

Weather: Hot, Calm, Clear | Sampling Method: Teflon Bailer (Y) N Other | SOP Cleaning (Y) N

Comments:

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES

A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.
							GWS Influent			
							GWS Effluent			
							Equipment Blank			
							Equipment Blank			
							Trip Blank			
							Duplicate ( )			
							Duplicate ( )			

TEST PARAMETERS

	Test Method	Container Type	Preserv. Type
A			
B			
C			
D			
E			

GROUNDWATER SAMPLES

Sample ID	Time	Source	pH	Temp.	Sp. Cond.	TD	Csg Dia (in)	DTW	Purge Vol
G9-GW-[illegible] 001			7.25	26.3°C	172.8	14.85	2"	8.81	3 Gals
			7.28	26.0°C	170.4				
			7.24	25.9°C	174.2				

UNITS: TEMPERATURE = DEGREES CELSIUS/pH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING, FOR 5x PURGE) 1.25" = 0.32 / 2" = 0.32 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41, PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

SAMPLOG.XLS

SAMPLING LOG

Page 1 of

BRE Project No: 7113 | Date: 7-12-96 | Sampler(s): C. Burson

Client Site ID: 32 GT | Facility Address: PC4 Naval Coastal System Station

Weather: Hot, clear, calm | Sampling Method: Teflon Bailer ☒ N Other | SOP Cleaning ☒ N

Comments:

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES

A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.
							GWS Influent			
							GWS Effluent			
							Equipment Blank			
							Equipment Blank			
							Trip Blank			
							Duplicate ( )			
							Duplicate ( )			

TEST PARAMETERS

	Test Method	Container Type	Preserv. Type
A			
B			
C			
D			
E			

GROUNDWATER SAMPLES

Sample ID	Time	Source	pH	Temp.	Sp. Cond.	TD	Csg Dia (in)	DTW	Purge Vol
GT-GW-TW01 001			7.49	27.0°C	200.0	14.80	2"	8.81	~~7 Gals~~
			7.44	26.6°C	1952				4.25 Gals
			7.46	26.7°C	144.8				

UNITS: TEMPERATURE = DEGREES CELSIUS/pH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING: FOR 5x PURGE) 1.25" = 0.32 / 2" = 0.82 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41, PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

Brown & Root Environmental — SAMPLING LOG — Page 1 of 1

BRE Project No: 7113 | Date: 7-12-96 | Sampler(s): C. Burgin

Client Site ID: GT | Facility Address: Naval Coastal Systems Station FL

Weather: Hot, Clear, calm | Sampling Method: Teflon Bailer ✓ N Other | SOP Cleaning ✓ N

Comments:

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES

A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.
							GWS Influent			
							GWS Effluent			
							Equipment Blank			
							Equipment Blank			
							Trip Blank			
							Duplicate ( )			
							Duplicate ( )			

TEST PARAMETERS

	Test Method	Container Type	Preserv. Type
A			
B			
C			
D			
E			

GROUNDWATER SAMPLES

Sample ID	Time	Source	pH	Temp.	Sp. Cond.	TD	Csg Dia (in)	DTW	Purge Vol
GT-GW-TW02 001			7.46	26.8°C	140.6	2"			5.5 Gals
			7.31	25.9°C	154.1	14.80	2"	8.03	
			7.29	25.9°C	146.6				
			7.26	25.8°C	144.7				

UNITS: TEMPERATURE = DEGREES CELSIUS/pH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING, FOR 5x PURGE) 1.25" = 0.32 / 2" = 0.82 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41, PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

Brown & Root Environmental — SAMPLING LOG — Page 1 of 1

BRE Project No: 7113	Date: 3-12-96	Samaler(s): C. Burn	
Client Site ID: G9	Facility Address: NAVAL COASTAL SYSTEM STATION PCY		
Weather: Hot, Clear, Calm	Samaling Method: Teflon Bailer (N) Other		SOP Cleaning (N)
Comments:			

GROUNDWATER SYSTEM PERFORMANCE AND QUALITY CONTROL SAMPLES

A	B	C	D	E	Sample ID	Time	Source	pH	Temp.	Sp. Cond.
							GWS Influent			
							GWS Effluent			
							Equipment Blank			
							Equipment Blank			
							Trip Blank			
							Duplicate ( )			
							Duplicate ( )			

TEST PARAMETERS

	Test Method	Container Type	Preserv. Type
A			
B			
C			
D			
E			

GROUNDWATER SAMPLES

Sample ID	Time	Source	pH	Temp.	Sp. Cond.	TD	Csg Dia (in)	DTW	Purge Vol
G9-GW-TW03-001			7.54	26.6°C	1343	11.75	2"	8.88	2.5 Gals
			7.50	25.8°C	131.2				
			7.60	26.2°C	140.8				
			7.54	26.0°C	136.4				

UNITS: TEMPERATURE = DEGREES CELSIUS/pH = STANDARD UNITS/SPECIFIC CONDUCTANCE = UMHOS/CM

WELL CASING VOLUMES (GALLONS/FT OF SATURATED CASING, FOR 5x PURGE) 1.25" = 0.32 / 2" = 0.32 / 4" = 3.27 / 6" = 7.35

NOTE: A 3x PURGE IS OK FOR: 4" = 1.96 / 6" = 4.41, PROVIDED 3 CONSISTENT REPEAT FIELD METER READINGS ARE OBSERVED

ATTACHMENT C-1
EXAMPLE GROUNDWATER LEVEL MEASUREMENT SHEET

GROUNDWATER LEVEL MEASUREMENT SHEET

Page 1 of 1

PROJECT NAME: CTO-0009 G9
PROJECT NUMBER: 7113
PERSONNEL: C. Bussin
DATE: 7-12-96
WEATHER CONDITIONS: Warm, clear, calm

LOCATION: G-9
MEASURING DEVICE: Water Level Indicator
ADJUSTMENT FACTOR:
REMARKS:

Well or Piezometer Number	Time	Elevation of Reference Point (Feet)*	Water Level Indicator Reading (Feet)	Groundwater Elevation (Feet)	Comments
MW01				8.81	
TW01				6.55	
TW02				8.03	
TW03				8.88	

Depth to Groundwater

*Measurements to nearest 0.01 foot.

Signature(s):

SINGLE SAMPLE LOG SHEET

Project Site Name: CTO-0008 G9

Project No.: 7417113

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☐ Sediment
- ☒ Other Groundwater
- ☐ QA Sample Type: _____

Sample ID No.: G9-GW-MW01-001

Sample Location: MW01

Sampled By: C. Buggin

C.O.C. No.: _____

Sample Method: Disposable Teflon bailer

Depth Sampled: 8.81 To 14.85

Sample Date and Time: 7-12-96 / 1010

Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data

Sample	Time	Color/Description

Grab Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)

Analysis	Container Requirements	Collected ☑
601	40 ml	✓
602	40 ml	✓
610	1 Liter	✓
504	125 ml	✓
239.2	500 ml	✓
418.1		✓

Map:

Observations/Notes:

Circle if Applicable:

MS/MSD	Duplicate ID No:

Signature(s):

SINGLE SAMPLE LOG SHEET

Project Site Name: CTO-0008 G9

Project No.: 7113

Sample ID No.: G9-GW-TW01-001

Sample Location: TW01

Sampled By: C. Burgin

C.O.C. No.: _____

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☐ Sediment
- ☒ Other Groundwater
- ☐ QA Sample Type: _____

Sample Method: Disposable Teflon bailer

Depth Sampled: 6.55 TO 14.81

Sample Date and Time: 7-12-96 / 1025

Type of Sample

- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data

Sample	Time	Color/Description

Grab Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)

Analysis	Container Requirements	Collected (✓)
610	1 LITER	✓

Map:

Observations/Notes:

Circle if Applicable:

MS/MSD | Duplicate ID No:

Signature(s):

SINGLE SAMPLE LOG SHEET

Project Site Name: CTO-0008 G9

Project No.: 7113

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☐ Sediment
- ☒ Other Ground water
- ☐ QA Sample Type: _____

Sample ID No.: G9-GW-TW02-001

Sample Location: TW02

Sampled By: C. Burgin

C.O.C. No.: _____

Sample Method: Disposable Teflon Bailer

Depth Sampled: 8.03 To 14.80

Sample Date and Time: 7-12-96 / 1031

Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data

Sample	Time	Color/Description

Grab Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)

Analysis	Container Requirements	Collected (✓)
610	1 Liter	✓

Map:

Observations/Notes:

Circle if Applicable:

MS/MSD | Duplicate ID No:

Signature(s):

SINGLE SAMPLE LOG SHEET

Project Site Name: CTO-0008 G7

Project No.: 7113

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☐ Sediment
- ☒ Other Groundwater
- ☐ QA Sample Type: _____

Sample ID No.: ~~BT~~ G7-GW-TW03-001

Sample Location: TW03

Sampled By: C. Burgin

C.O.C. No.: _____

Sample Method: Disposable Teflon bailer

Depth Sampled: 8.88 TO 11.75

Sample Date and Time: 7-12-96 / 1036

Type of Sample
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite
- ☐ High Concentration
- ☐ Low Concentration

Composite Sample Data

Sample	Time	Color/Description

Grab Sample Data

Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)

Analysis	Container Requirements	Collected (✓)
610	1 LTGK	✓

Map:

Observations/Notes:

Circle if Applicable:

MS/MSD | Duplicate ID No:

Signature(s):

APPENDIX I

GROUNDWATER LABORATORY DATA SHEETS

CATIONS DATA PACKAGE

CASE NARRATIVE
Cations

Laboratory: CH2M Hill, Lab Ref. No: MB367

Client/Project: Brown & Root Coastal Systems Station

I. Holding Time:
All holding times were met.

II. Digestion Exceptions:
None.

III. Analysis:

A. Calibration:
All acceptance criteria were met.

B. Blanks:
All acceptance criteria were met.

C. ICP Interference Check Sample:
Not required for this analysis.

D. Spike Sample(s):
Batch specific QC was not requested for this sample batch.

E. Duplicate Sample(s):
Batch specific QC was not requested for this sample batch.

F. Laboratory Control Sample(s):
All acceptance criteria were met.

G. ICP Serial Dilution:
Not required for this analysis.

H. Other:
Client specific QC is included in the MB382 data package.

IV. Receipt Exceptions:
Any receipt exceptions will be addressed in a Sample Receipt Exception Report which will be attached to the Chain-of-Custody in this package.

V. Documentation Exceptions:
None.

VI. I certify that this data package is in compliance with the terms and conditions agreed to by the client and Quality Analytical Laboratories, Inc., both technically and for completeness, except for the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

SIGNED: Kaye Walker DATE: 7/31/96

Kaye Walker
Inorganic Division Manager

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

G9-MW01-1

Lab Name: CH2M_HILL_____ Contract: MB367_____

Lab Code: MGM___ Case No.: MB367_ SAS No.: MB367_ SDG No.: MB367_

Matrix (soil/water): WATER Lab Sample ID: MB367001__

Level (low/med): LOW__ Date Received: 07/13/96

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	20.1			F

Color Before: BROWN____ Clarity Before: CLOUDY Texture: N/A___

Color After: TAN_____ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

ILM02.1

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

G9-MW01-1B

Lab Name: CH2M_HILL_____ Contract: MB367_____

Lab Code: MGM___ Case No.: MB367_ SAS No.: MB367_ SDG No.: MB367_

Matrix (soil/water): WATER Lab Sample ID: MB367005__

Level (low/med): LOW__ Date Received: 07/13/96

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7439-92-1	Lead	0.79	B		F

Color Before: CLEAR____ Clarity Before: CLEAR_ Texture: N/A___

Color After: CLEAR____ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

ILMO2.1

GENERAL CHEMISTRY

CASE NARRATIVE
GENERAL CHEMISTRY

QAL Lab Reference No./SDG. MB367

Project: Brown & Root Coastal Systems Station

I. RECEIPT

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody included with this data package.

II. HOLDING TIMES

All holding times were met.

III. METHOD

The method used is cited in the corresponding Form I.

IV. PREPARATION

Sample preparation proceeded normally, if applicable.

V. ANALYSIS

A. Calibration : All acceptance criteria were met.

B. Blanks: All acceptance criteria were met.

C. Spikes: All acceptance criteria were met.

D. Duplicates: All acceptance criteria were met.

E. Laboratory Control Samples: All acceptance criteria were met.

F. Samples: Sample analyses proceeded normally.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and QAL, Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

SIGNED: Velinda Herbert DATE: 7/30/96

Velinda Herbert
General Organic/Inorganic Chemist

Report of Analytical Results

Client Sample ID: G9-MW01-1
Sample Description: GRAB
Sample Matrix: Water

Date Collected: 07/12/96 (Friday)
Date Received: 07/13/96 (Saturday)

Lab Reference No: MB367
Lab Sample ID: MB367001

CATEGORY NAME Analytical Parameter	Result	Units	Reporting Level	Date of Analysis	Analytical Method(s)
DEMAND AND GENERAL ORGANIC					
Total Petroleum Hydrocarbons	10.7	mg/L	0.25	07/23/96	EPA418.1

(6543)

Report of Analytical Results

Client Sample ID: G9-MW01-1B
Sample Description: GRAB
Sample Matrix: Water

Date Collected: 07/12/96 (Friday)
Date Received: 07/13/96 (Saturday)

Lab Reference No: MB367
Lab Sample ID: MB367005

CATEGORY NAME Analytical Parameter	Result	Units	Reporting Level	Date of Analysis	Analytical Method(s)
DEMAND AND GENERAL ORGANIC					
Total Petroleum Hydrocarbons	< 0.05	mg/L	0.05	07/23/96	EPA418.1

(6543)

Brown & Root Environmental
455 FAIRWAY DRIVE, SUITE 200
DEERFIELD BEACH, FLORIDA 33441
(305) 570-5885 (305) 570-5974 (FAX)

SITE MANAGER: G. Goode
PROJECT NAME: CTO 0008
BRE PROJECT NO.: 7113 CODE:
P.O. NO.:

SHIPPED TO: Quality Analytical Montgomery, Ala (LABORATORY NAME, CITY)

PAGE 1 OF 1

CHAIN OF CUSTODY RECORD

LABORATORY ANALYSIS

SAMPLED BY (PRINT): C. Burgin
SAMPLER SIGNATURE:

☑ STANDARD TAT ☐ RUSH
☐ 24 HR. ☐ 48 HR. ☐ 72 HR. ☐ 7 DAYS
RESULTS DUE DATE:

LAB NO.	DATE	TIME	SAMPLE IDENTIFICATION	SAMPLE TYPE COMP.	SAMPLE TYPE GRAB	MATRIX	PRES. TYPE	PARAMETERS 601	602	504	239.2	1610	TRPH			NUMBER OF CONTAINERS	COMMENTS:
			GT-GW-MW01-001			GW		3	3	2	1	2	1			1P	Samples ICE'd
			GT-GW-TW01-001									2				2	
			GT-GW-TW02-001									2				2	
			GT-GW-TW03-001									2				2	
			GT-GW-MW01-001B			AQ		3	3	2	1	2	1			1P	
			Trip Blank														
			Temp Blank														

FOR LAB USE ONLY BS
MB 367
BS
DS

TOTAL NUMBER OF CONTAINERS

EMPTY BOTTLES RELINQUISHED BY (SIGNATURE) ①	SEAL INTACT? YES NO N/A	DATE: 7/12/96 TIME: 0930	EMPTY BOTTLES RECEIVED BY (SIGNATURE) ②	SEAL INTACT? YES NO N/A	DATE: 7-10-96 TIME: 1200
RELINQUISHED BY (SIGNATURE) ③	SEAL INTACT? YES NO N/A	DATE: 7-12-96 TIME: 1830	RECEIVED BY (SIGNATURE) ④ Fed EX	SEAL INTACT? YES NO N/A	DATE: TIME:
RELINQUISHED BY (SIGNATURE) ⑤	SEAL INTACT? YES NO N/A	DATE: TIME:	RECEIVED BY (SIGNATURE) ⑥ David Sline	SEAL INTACT? YES NO N/A	DATE: 7-13-96 TIME: 09:00A

SPECIAL INSTRUCTIONS:

LABORATORY REMARKS:

SAMPLE CONTAINERS PRECLEANED BY: ☐ BRE ☐ LABORATORY ☑ MANUFACTURER

METHOD OF SHIPMENT: Fed EX

BILL OF LADING NO.:

WHITE-FULLY EXECUTED COPY
YELLOW-RECEIVING LABORATORY COPY
PINK-SAMPLERS' COPY/QA COPY
GOLDENROD-SITE MANAGERS' COPY

SAMPLING TEAM: C. Burgin

RECEIVED FOR LABORATORY BY (SIGNATURE): Billy Scott
DATE: 7/13/96 TIME: 09:00

No. 0059

NO. 39150 (9/95)

Sample Receipt Exceptions Report

Batch Number: MB367 Origination date: 7/13/96

Client/Project: Brown & Root

SUMMARY OF EXCEPTION (check one if it applies)

√	Description of exception	Comments (write number of exception description and the impacted sample numbers)
	1. No custody seal as required by the project.	Sample I.D. G9-GW-TW01-001 had 1 broken container (1-liter for 610)
	2. No chain-of-custody provided.	
	3. Chain-of-custody provided but incomplete.	
✓	4. Samples broken or leaking on receipt.	
	5. Temperature of samples inappropriate for analysis requested.	
	6. Container inappropriate for analysis requested.	
	7. Inadequate sample volume for analysis requested.	
	8. Preservation inappropriate for analysis requested.	
	9. Samples received out of holding time for analysis requested.	
	10. Samples received more than 72 hours after sampling.	
	11. Discrepancies between chain-of-custody and container labels.	
	12. Other (describe on right)	

FRACTION(S) AFFECTED (specify which fraction was affected by the exceptions detailed above by writing the number of the exception next to it)

Unpreserved		Nutrients		Metals		Volatiles	
Cyanide		Extractables		Extractables	✓	Other (specify)	

ACTION TAKEN:

Originator: Billy Scott Supervisor:

Client was notified on: (DATE/TIME) 7/15 Client contact: Terry Goode

Client's comments: Proceed w/ analysis

Client Services: Rh QA officer:

000125

QAL Montgomery

RECT_CAR.DOC (7/1/96)

GC PURGEABLE HALOCARBONS

CASE NARRATIVE
GC PURGEABLE HALOCARBONS

QAL Lab Reference No./SDG. MB367

Project: BROWN & ROOT COASTAL SYSTEMS STATION

I. **RECEIPT**

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody included with this data package.

II. **HOLDING TIMES**

A. Sample Preparation: Not applicable.

B. Sample Analysis: All holding times were met.

III. **METHOD**

Preparation: N/A
Cleanup: N/A
Analysis: EPA 601 (MOD)

IV. **PREPARATION**

Not applicable.

V. **ANALYSIS**

A. Calibration : All acceptance criteria were met.

B. Blanks: All acceptance criteria were met.

C. Surrogates: All acceptance criteria were met.

D. Matrix Spikes: 2-Chloroethyl vinyl ether was outside acceptable limits for Accuracy (% Recovery) and Precision (RPD). However, analysis of a Laboratory Control Sample immediately after the matrix spikes indicated the analytical system was in control for the compounds found in the associated samples. Since MS/MSD results are subject to matrix effects, these values should be considered to be advisory.

E. Samples: Sample MB367001 (G9-MW01-1) contained unidentified, late-eluting compounds.

Primary analysis utilized a Restek Rtx 502.2 (105 meter x 0.53 mm) column. Confirmation analysis used a J&W Scientific DB-VRX (75 meter x 0.45 mm) column.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and QAL, Inc., both technically and for completeness except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

SIGNED: for Herb Kelly, Organic Division Manager DATE: 08-06-96

CASE NARRATIVE
Addendum

Sample Information

LAB SAMPLE ID	CLIENT SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	SAMPLE pH[1]
MB367001	G9-MW01-1	WATER	7/12/96	N/A	7/19/96	<2
MB367005	G9-MW01-1B	WATER	7/12/96	N/A	7/19/96	<2
MB367006RE	TRIP_BLANK	WATER	7/12/96	N/A	7/19/96	<2
WMV096G182	VBLK001	WATER	N/A	N/A	7/18/96	N/A
WMV096G191	VBLK002	WATER	N/A	N/A	7/19/96	N/A

[1] Applies to samples designated for purgeable VOA analysis only.

CURRENT METHOD DETECTION LIMITS (MDLs)
PURGEABLE HALOCARBONS

Date collected:	N/A	Sample Group:	LABQC
Date extracted:	N/A	Lab Sample ID:	Multiple Samples
Date analyzed:	3/13/96	Lab file 1 ID:	N/A
Matrix:	Water	Lab file 2 ID:	N/A
Method:	EPA601 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	0.093
75-25-2	Bromoform	1.0	0.142
74-83-9	Bromomethane	1.0	0.089
56-23-5	Carbon tetrachloride	1.0	0.090
108-90-7	Chlorobenzene	1.0	0.141
75-00-3	Chloroethane	1.0	0.101
110-75-8	2-Chloroethyl vinyl ether	1.0	0.100
67-66-3	Chloroform	1.0	0.086
74-87-3	Chloromethane	1.0	0.138
124-48-1	Dibromochloromethane	1.0	0.106
95-50-1	1,2-Dichlorobenzene	1.0	0.128
541-73-1	1,3-Dichlorobenzene	1.0	0.137
106-46-7	1,4-Dichlorobenzene	1.0	0.145
75-71-8	Dichlorodifluoromethane	1.0	0.181
75-34-3	1,1-Dichloroethane	1.0	0.079
107-06-2	1,2-Dichloroethane	1.0	0.089
75-35-4	1,1-Dichloroethene	1.0	0.138
156-59-2	cis-1,2-Dichloroethene	1.0	0.074
156-60-5	trans-1,2-Dichloroethene	1.0	0.066
78-87-5	1,2-Dichloropropane	1.0	0.097
10061-01-5	cis-1,3-Dichloropropene	1.0	0.095
10061-02-6	trans-1,3-Dichloropropene	1.0	0.113
75-09-2	Methylene chloride (Dichloromethane)	5.0	2.029
79-34-5	1,1,2,2-Tetrachlorethane	1.0	0.214
127-18-4	Tetrachloroethene	1.0	0.104
71-55-6	1,1,1-Trichloroethane	1.0	0.088
79-00-5	1,1,2-Trichloroethane	1.0	0.135
79-01-6	Trichloroethene	1.0	0.091
75-69-4	Trichlorofluoromethane	1.0	0.096
75-01-4	Vinyl chloride	1.0	0.160

CLIENT SAMPLE ID

G9-MW01-1

REPORT OF ANALYTICAL RESULTS
PURGEABLE HALOCARBONS

Date collected:	7/12/96	Sample Group:	MB367
Date extracted:	N/A	Lab Sample ID:	MB367001
Date analyzed:	7/19/96	Lab file 1 ID:	G18T024
Matrix:	Water	Lab file 2 ID:	G18U024
Method:	EPA601 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
75-00-3	Chloroethane	1.0	U
110-75-8	2-Chloroethyl vinyl ether	1.0	U
67-66-3	Chloroform	1.0	1.6
74-87-3	Chloromethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
75-09-2	Methylene chloride (Dichloromethane)	5.0	U
79-34-5	1,1,2,2-Tetrachlorethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
75-01-4	Vinyl chloride	1.0	U
	SURROGATE-Fluorobenzene (QC Limits - 61-133%)		102 % Rec.

CLIENT SAMPLE ID

TRIP_BLANK

REPORT OF ANALYTICAL RESULTS
PURGEABLE HALOCARBONS

Date collected:	7/12/96	Sample Group:	MB367
Date extracted:	N/A	Lab Sample ID:	MB367006RE
Date analyzed:	7/19/96	Lab file 1 ID:	G19T012
Matrix:	Water	Lab file 2 ID:	G19U012
Method:	EPA601 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
75-00-3	Chloroethane	1.0	U
110-75-8	2-Chloroethyl vinyl ether	1.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
75-09-2	Methylene chloride (Dichloromethane)	5.0	U
79-34-5	1,1,2,2-Tetrachlorethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
75-01-4	Vinyl chloride	1.0	U
	SURROGATE-Fluorobenzene (QC Limits - 61-133%)		93 % Rec.

CLIENT SAMPLE ID

VBLK001

REPORT OF ANALYTICAL RESULTS
PURGEABLE HALOCARBONS

Date collected:	N/A	Sample Group:	LABQC
Date extracted:	N/A	Lab Sample ID:	WMV096G182
Date analyzed:	7/18/96	Lab file 1 ID:	G18T015
Matrix:	Water	Lab file 2 ID:	G18U015
Method:	EPA601 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
75-00-3	Chloroethane	1.0	U
110-75-8	2-Chloroethyl vinyl ether	1.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
75-09-2	Methylene chloride (Dichloromethane)	5.0	U
79-34-5	1,1,2,2-Tetrachlorethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
75-01-4	Vinyl chloride	1.0	U
	SURROGATE-Fluorobenzene (QC Limits - 61-133%)		101 % Rec.

CLIENT SAMPLE ID

VBLK002

REPORT OF ANALYTICAL RESULTS
PURGEABLE HALOCARBONS

Date collected:	N/A	Sample Group:	LABQC
Date extracted:	N/A	Lab Sample ID:	WMV096G191
Date analyzed:	7/19/96	Lab file 1 ID:	G19T002
Matrix:	Water	Lab file 2 ID:	G19U002
Method:	EPA601 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
75-27-4	Bromodichloromethane	1.0	U
75-25-2	Bromoform	1.0	U
74-83-9	Bromomethane	1.0	U
56-23-5	Carbon tetrachloride	1.0	U
108-90-7	Chlorobenzene	1.0	U
75-00-3	Chloroethane	1.0	U
110-75-8	2-Chloroethyl vinyl ether	1.0	U
67-66-3	Chloroform	1.0	U
74-87-3	Chloromethane	1.0	U
124-48-1	Dibromochloromethane	1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	U
75-71-8	Dichlorodifluoromethane	1.0	U
75-34-3	1,1-Dichloroethane	1.0	U
107-06-2	1,2-Dichloroethane	1.0	U
75-35-4	1,1-Dichloroethene	1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	U
78-87-5	1,2-Dichloropropane	1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	U
75-09-2	Methylene chloride (Dichloromethane)	5.0	U
79-34-5	1,1,2,2-Tetrachlorethane	1.0	U
127-18-4	Tetrachloroethene	1.0	U
71-55-6	1,1,1-Trichloroethane	1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	U
79-01-6	Trichloroethene	1.0	U
75-69-4	Trichlorofluoromethane	1.0	U
75-01-4	Vinyl chloride	1.0	U
	SURROGATE-Fluorobenzene (QC Limits - 61-133%)		103 % Rec.

GC PURGEABLE AROMATICS

CASE NARRATIVE
GC PURGEABLE AROMATICS

QAL Lab Reference No./SDG. MB367

Project: BROWN & ROOT COASTAL SYSTEMS STATION

I. RECEIPT

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody included with this data package.

II. HOLDING TIMES

A. Sample Preparation: Not applicable.

B. Sample Analysis: All holding times were met.

III. METHOD

Preparation: N/A
Cleanup: N/A
Analysis: EPA 602 (MOD)

IV. PREPARATION

Not applicable.

V. ANALYSIS

A. Calibration : All acceptance criteria were met.

B. Blanks: All acceptance criteria were met.

C. Surrogates: All acceptance criteria were met.

D. Matrix Spikes: All acceptance criteria were met.

E. Samples: Sample MB367001 (G9-MW01-1) contained unidentified, late-eluting compounds.

Primary analysis utilized a Restek Rtx 502.2 (105 meter x 0.53 mm) column. Confirmation analysis used a J&W Scientific DB-VRX (75 meter x 0.45 mm) column.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and QAL, Inc., both technically and for completeness except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

SIGNED: Jwell W. Smiley for Herb Kelly
Organic Division Manager

DATE: 08-06-96

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CASE NARRATIVE
Addendum

Sample Information

LAB SAMPLE ID	CLIENT SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	SAMPLE pH[1]
MB367001	G9-MW01-1	WATER	7/12/96	N/A	7/19/96	<2
MB367005	G9-MW01-1B	WATER	7/12/96	N/A	7/19/96	<2
MB367006RE	TRIP_BLANK	WATER	7/12/96	N/A	7/19/96	<2
WMV096G182	VBLK001	WATER	N/A	N/A	7/18/96	N/A
WMV096G191	VBLK002	WATER	N/A	N/A	7/19/96	N/A

[1] Applies to samples designated for purgeable VOA analysis only.

CURRENT METHOD DETECTION LIMITS (MDLs)
PURGEABLE AROMATICS

Date collected:	N/A	Sample Group:	LABQC
Date extracted:	N/A	Lab Sample ID:	Multiple Samples
Date analyzed:	3/13/96	Lab file 1 ID:	N/A
Matrix:	Water	Lab file 2 ID:	N/A
Method:	EPA602 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
71-43-2	Benzene	1.0	0.102
108-90-7	Chlorobenzene	1.0	0.141
95-50-1	1,2-Dichlorobenzene	1.0	0.128
541-73-1	1,3-Dichlorobenzene	1.0	0.137
106-46-7	1,4-Dichlorobenzene	1.0	0.145
100-41-4	Ethylbenzene	1.0	0.129
1634-04-4	tert-butyl methyl ether	1.0	0.087
108-88-3	Toluene	1.0	0.102
108-38-3/106-42-3	m-, p-Xylene	2.0	0.312
95-47-6	o-Xylene	1.0	0.189

CLIENT SAMPLE ID

G9-MW01-1

REPORT OF ANALYTICAL RESULTS
PURGEABLE AROMATICS

Date collected:	7/12/96	Sample Group:	MB367
Date extracted:	N/A	Lab Sample ID:	MB367001
Date analyzed:	7/19/96	Lab file 1 ID:	G18T024
Matrix:	Water	Lab file 2 ID:	G18U024
Method:	EPA602 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
71-43-2	Benzene	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
1330-20-7	Xylenes (Total)	1.0	U
N/A	Total Volatile Organic Aromatics	1.0	U
1634-04-4	Methyl-tert-butyl ether	1.0	U
	SURROGATE-Fluorobenzene (QC Limits - 61-133%)		102 % Rec.

CLIENT SAMPLE ID

G9-MW01-1B

REPORT OF ANALYTICAL RESULTS
PURGEABLE AROMATICS

Date collected:	7/12/96	Sample Group:	MB367
Date extracted:	N/A	Lab Sample ID:	MB367005
Date analyzed:	7/19/96	Lab file 1 ID:	G18T023
Matrix:	Water	Lab file 2 ID:	G18U023
Method:	EPA602 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
71-43-2	Benzene	1.0	U
108-88-3	Toluene	1.0	1.2
100-41-4	Ethylbenzene	1.0	U
1330-20-7	Xylenes (Total)	1.0	U
N/A	Total Volatile Organic Aromatics	1.0	1.2
1634-04-4	Methyl-tert-butyl ether	1.0	U
	SURROGATE-Fluorobenzene (QC Limits - 61-133%)		102 % Rec.

CLIENT SAMPLE ID

TRIP_BLANK

REPORT OF ANALYTICAL RESULTS
PURGEABLE AROMATICS

Date collected:	7/12/96	Sample Group:	MB367
Date extracted:	N/A	Lab Sample ID:	MB367006RE
Date analyzed:	7/19/96	Lab file 1 ID:	G19T012
Matrix:	Water	Lab file 2 ID:	G19U012
Method:	EPA602 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
71-43-2	Benzene	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
1330-20-7	Xylenes (Total)	1.0	U
N/A	Total Volatile Organic Aromatics	1.0	U
1634-04-4	Methyl-tert-butyl ether	1.0	U
	SURROGATE-Fluorobenzene (QC Limits - 61-133%)		93 % Rec.

CLIENT SAMPLE ID

VBLK001

REPORT OF ANALYTICAL RESULTS
PURGEABLE AROMATICS

Date collected:	N/A	Sample Group:	LABQC
Date extracted:	N/A	Lab Sample ID:	WMV096G182
Date analyzed:	7/18/96	Lab file 1 ID:	G18T015
Matrix:	Water	Lab file 2 ID:	G18U015
Method:	EPA602 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
71-43-2	Benzene	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
1330-20-7	Xylenes (Total)	1.0	U
N/A	Total Volatile Organic Aromatics	1.0	U
1634-04-4	Methyl-tert-butyl ether	1.0	U
	SURROGATE-Fluorobenzene (QC Limits - 61-133%)		101 % Rec.

CLIENT SAMPLE ID

VBLK002

REPORT OF ANALYTICAL RESULTS
PURGEABLE AROMATICS

Date collected:	N/A	Sample Group:	LABQC
Date extracted:	N/A	Lab Sample ID:	WMV096G191
Date analyzed:	7/19/96	Lab file 1 ID:	G19T002
Matrix:	Water	Lab file 2 ID:	G19U002
Method:	EPA602 (MOD)	Dilution factor:	1.0
% Moisture:	100	Reporting units:	ug/L

CAS NUMBER	COMPOUND NAME	REPORTING LIMIT	RESULT
71-43-2	Benzene	1.0	U
108-88-3	Toluene	1.0	U
100-41-4	Ethylbenzene	1.0	U
1330-20-7	Xylenes (Total)	1.0	U
N/A	Total Volatile Organic Aromatics	1.0	U
1634-04-4	Methyl-tert-butyl ether	1.0	U
	SURROGATE-Fluorobenzene (QC Limits - 61-133%)		103 % Rec.

000217

GC EXTRACTABLE VOLATILE ORGANICS
(EDB)

CASE NARRATIVE
GC EXTRACTABLE VOLATILE ORGANICS (EDB)

QAL Lab Reference No./SDG. MB367

Project: Brown & Root Coastal Systems Station

I. RECEIPT

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody included with this data package.

II. HOLDING TIMES

A. Sample Preparation: All holding times were met.

B. Sample Analysis: All holding times were met.

III. METHOD

Preparation: N/A
Cleanup: N/A
Analysis: EPA 504.1

IV. PREPARATION

Sample preparation proceeded normally.

V. ANALYSIS

A. Calibration: All acceptance criteria were met.

B. Blanks: All acceptance criteria were met.

C. Surrogates: All acceptance criteria were met.

D. Spikes: These water samples have been referenced to QC from another laboratory contract. The native sample, matrix spike, and matrix spike duplicate will be reported with the results of our laboratory contract number MB370 (MB370003MS and MB370003MSD).

E. Samples: Sample analysis proceeded normally.

A summary of current applicable method detection limits (MDLs) immediately follows this case narrative.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and QAL, Inc., both technically and for completeness except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

SIGNED: Tammy Carey DATE: 7/31/96

Tammy Carey
Chemist

CASE NARRATIVE

Addendum

Sample Information

LAB SAMPLE ID	CLIENT SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	SAMPLE pH[1]
MB367001	G9-MW01-1	WATER	07/12/96	07/29/96	07/29/96	N/A
MB367005	G9-MW01-1B	WATER	07/12/96	07/29/96	07/29/96	N/A
W07296B1	QC BLANK	WATER	N/A	07/29/96	07/29/96	N/A

[1] Applies to samples designated for purgeable VOA analysis only.

ORGANICS ANALYSIS METHOD DETECTION LIMITS

GC EXTRACTABLE VOLATILE ORGANICS (EDB)

Laboratory Name: CH2M HILL Sample Matrix: WATER
Analytical Method: 504.1

CAS Number	Compound	MDL ug/L
106-93-4	1,2-Dibromoethane (EDB)	0.003

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL	Concentration:.	LOW	Date Extracted:	07/29/96
Lab Sample ID:	MB367005	Sample Matrix:	WATER	Date Analyzed:	07/29/96
Client Sample ID:	G9-MW01-1B	Percent Moisture:		Dilution Factor:	1.0

GC EXTRACTABLE VOLATILE ORGANICS (EDB)

CAS Number		ug/L
106-93-4	1,2-Dibromoethane (EDB) . . .	0.02 U

1,1,2,2-Tetrachloroethane - SS 91

U - Analyzed for but not detected.
B - Detected in QC blank.
J - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments:

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL	Concentration:	LOW	Date Extracted:	07/29/96
Lab Sample ID:	MB367001	Sample Matrix:	WATER	Date Analyzed:	07/29/96
Client Sample ID:	G9-MW01-1	Percent Moisture:		Dilution Factor:	1.0

GC EXTRACTABLE VOLATILE ORGANICS (EDB)

CAS Number		ug/L
106-93-4	1,2-Dibromoethane (EDB) . . .	0.02 U

1,1,2,2-Tetrachloroethane - SS 92

U - Analyzed for but not detected.
B - Detected in QC blank.
J - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments:

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL	Concentration:	LOW	Date Extracted:	07/29/96
Lab Sample ID:	W07296B1	Sample Matrix:	WATER	Date Analyzed:	07/29/96
Client Sample ID:	QC BLANK	Percent Moisture:		Dilution Factor:	1.0

GC EXTRACTABLE VOLATILE ORGANICS (EDB)

CAS Number		ug/L
106-93-4	1,2-Dibromoethane (EDB) . . .	0.02 U

1,1,2,2-Tetrachloroethane - SS 93

U - Analyzed for but not detected.
B - Detected in QC blank.
J - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments:

Form I

GC POLYNUCLEAR AROMATIC HYDROCARBONS

CASE NARRATIVE
GC POLYNUCLEAR AROMATIC HYDROCARBONS

QAL Lab Reference No./SDG. MB367

Project: Brown & Root Coastal Systems Station

I. RECEIPT

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody included with this data package.

II. HOLDING TIMES

A. Sample Preparation: All holding times were met.

B. Sample Analysis: All holding times were met.

III. METHOD

Preparation: N/A
Cleanup: N/A
Analysis: EPA 610

IV. PREPARATION

Sample preparation proceeded normally.

V. ANALYSIS

A. Calibration: All acceptance criteria were met.

Both the initial calibration and continuing calibration summaries include data for both the primary and confirmation columns. Each compound will appear in the summary reports twice. The first time the compound will not be proceeded by the "#" symbol, referring to compounds identified from the first column (RTX-5); the next time it will have the "#"symbol, referring to compounds identified from the second column (RTX-200) (for example, Naphthalene and #Naphthalene).

B. Blanks: All acceptance criteria were met.

C. Surrogates: Surrogate recovery for sample MB367002 was slightly outside current laboratory QC limits. A re-extraction could not be performed due to lack of raw sample volume. Acceptance criteria for all other samples were met.

D. Spikes: This water sample has been referenced to QC from another laboratory contract. The native sample, matrix spike, and matrix spike duplicate will be reported with the results of our laboratory contract number MB370 (MB370003MS and MB370003MSD).

E. Samples: Sample MB367001 was diluted due to chemical interferences not removed during the cleanup procedure. Frequently interferences will persist in the extract even after cleanup procedures. Standard cleanup procedures are designed to recover the target compounds and remove interfering non-targets. Precise rules for diluting interferences are difficult to develop. A single non-target peak could be allowed to saturate the detector. However, extracts with multiple non-target peaks might elevate the baseline or alter the baseline noise for part of the chromatogram. If the baseline were severely elevated or noise obstructed the target chromatographic region, targets at or near the report limit could not be positively identified within the interfering peaks. Because GC identification is based largely on retention time, regions with many peaks (noisy regions) will frequently have many false positives. For samples with such chromatographic interference, positive hits are typically not reported unless the peak is significantly above the surrounding noise and/or is not obstructed on one or both analytical columns. In addition, such interferences can be damaging to the chromatography and on-going calibration criteria can not be achieved. Without dilution, report limits would usually be raised in samples with significant interference. Therefore, such samples are typically diluted to minimize interferences and yet achieve the best possible report limits. All other aspects of sample analysis proceeded normally.

A summary of current applicable method detection limits (MDLs) immediately follows this case narrative.

F. Other: Primary and confirmation data were simultaneously acquired using two dissimilar analytical columns (RTX-5 and RTX-200) connected in parallel to one injection port and one detector.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and QAL, Inc., both technically and for completeness except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

SIGNED: Tammy Carey DATE: 7/31/96

Tammy Carey
Chemist

CASE NARRATIVE

Addendum

Sample Information

LAB SAMPLE ID	CLIENT SAMPLE ID	SAMPLE MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	SAMPLE pH[1]
MB367001	G9-MW01-1	WATER	07/12/96	07/15/96	07/24/96	N/A
MB367002	G9-TW01-1	WATER	07/12/96	07/15/96	07/24/96	N/A
MB367003	G9-TW02-1	WATER	07/12/96	07/15/96	07/25/96	N/A
MB367004	G9-TW03-1	WATER	07/12/96	07/15/96	07/25/96	N/A
MB367005	G9-MW01-1B	WATER	07/12/96	07/15/96	07/25/96	N/A
W07156B1	NBLK06	WATER	N/A	07/15/96	07/24/96	N/A

[1] Applies to samples designated for purgeable VOA analysis only.

ORGANICS ANALYSIS METHOD DETECTION LIMITS

POLYNUCLEAR AROMATIC HYDROCARBON (PNA) COMPOUNDS

Laboratory Name: CH2M HILL Sample Matrix: WATER
Analytical Method: 610 Extraction: SEPARATORY FUNNEL

Compound	MDL ug/L
Naphthalene	0.57
2-Methylnaphthalene	0.47
1-Methylnaphthalene	0.42
Acenaphthylene	0.38
Acenaphthene	0.41
Fluorene	0.38
Phenanthrene	0.51
Anthracene	0.32
Fluoranthene	0.60
Pyrene	0.27
Benzo(a)anthracene	0.24
Chrysene	0.49
Benzo(b)fluoranthene	0.40
Benzo(k)fluoranthene	0.39
Benzo(a)pyrene	0.33
Indeno(123-cd)pyrene	0.40
Dibenzo(ah)anthracene	0.30
Benzo(ghi)perylene	0.27

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL
Lab Sample ID: MB367001
Client Sample ID: G9-MW01-1

Concentration: LOW
Sample Matrix: WATER
Volume Extracted: 1070mL

Date Extracted: 07/15/96
Date Analyzed: 07/24/96
Dilution Factor: 10

PNA COMPOUNDS

CAS Number		ug/L	
91-20-3	Naphthalene	20	U
91-57-6	2-Methylnaphthalene	20	U
90-12-0	1-Methylnaphthalene	20	U
208-96-8	Acenaphthylene	20	U
83-32-9	Acenaphthene	20	U
86-73-7	Fluorene	20	U
85-01-8	Phenanthrene	20	U
120-12-7	Anthracene	20	U
206-44-0	Fluoranthene	20	U
129-00-0	Pyrene	20	U
56-55-3	Benzo(a)anthracene	20	U
218-01-9	Chrysene	20	U
205-99-2	Benzo(b)fluoranthene	20	U
207-08-9	Benzo(k)fluoranthene	20	U
50-32-8	Benzo(a)pyrene	20	U
193-39-5	Indeno(1,2,3-cd)pyrene	20	U
53-70-3	Dibenzo(a,h)anthracene	20	U
191-24-2	Benzo(g,h,i)perylene	20	U
	Terphenyl-d14 - SS	66	%

U - Analyzed for but not detected.
B - Detected in QC blank.
J - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments:

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL	Concentration:	LOW	Date Extracted:	07/15/96
Lab Sample ID:	MB367002	Sample Matrix:	WATER	Date Analyzed:	07/24/96
Client Sample ID:	G9-TW01-1	Volume Extracted:	1050mL	Dilution Factor:	1.0

PNA COMPOUNDS

CAS Number		ug/L	
91-20-3	Naphthalene	2	U
91-57-6	2-Methylnaphthalene	2	U
90-12-0	1-Methylnaphthalene	2	U
208-96-8	Acenaphthylene	2	U
83-32-9	Acenaphthene	2	U
86-73-7	Fluorene	2	U
85-01-8	Phenanthrene	2	U
120-12-7	Anthracene	2	U
206-44-0	Fluoranthene	2	U
129-00-0	Pyrene	2	U
56-55-3	Benzo(a)anthracene	2	U
218-01-9	Chrysene	2	U
205-99-2	Benzo(b)fluoranthene	2	U
207-08-9	Benzo(k)fluoranthene	2	U
50-32-8	Benzo(a)pyrene	2	U
193-39-5	Indeno(1,2,3-cd)pyrene	2	U
53-70-3	Dibenzo(a,h)anthracene	2	U
191-24-2	Benzo(g,h,i)perylene	2	U
	Terphenyl-d14 - SS	45	%

U - Analyzed for but not detected.
B - Detected in QC blank.
J - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments: Surrogate recovery outside QC advisory limits. Reextraction could not be performed due to lack of extra sample container.

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL	Concentration:	LOW	Date Extracted:	07/15/96
Lab Sample ID:	MB367003	Sample Matrix:	WATER	Date Analyzed:	07/25/96
Client Sample ID:	G9-TW02-1	Volume Extracted:	1050mL	Dilution Factor:	1.0

PNA COMPOUNDS

CAS Number		ug/L	
91-20-3	Naphthalene	2	U
91-57-6	2-Methylnaphthalene	2	U
90-12-0	1-Methylnaphthalene	2	U
208-96-8	Acenaphthylene	2	U
83-32-9	Acenaphthene	2	U
86-73-7	Fluorene	2	U
85-01-8	Phenanthrene	2	U
120-12-7	Anthracene	2	U
206-44-0	Fluoranthene	2	U
129-00-0	Pyrene	2	U
56-55-3	Benzo(a)anthracene	2	U
218-01-9	Chrysene	2	U
205-99-2	Benzo(b)fluoranthene	2	U
207-08-9	Benzo(k)fluoranthene	2	U
50-32-8	Benzo(a)pyrene	2	U
193-39-5	Indeno(1,2,3-cd)pyrene	2	U
53-70-3	Dibenzo(a,h)anthracene	2	U
191-24-2	Benzo(g,h,i)perylene	2	U
	Terphenyl-d14 - SS	69	%

U - Analyzed for but not detected.
B - Detected in QC blank.
J - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments:

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL	Concentration:	LOW	Date Extracted:	07/15/96
Lab Sample ID:	MB367004	Sample Matrix:	WATER	Date Analyzed:	07/25/96
Client Sample ID:	G9-TW03-1	Volume Extracted:	1050mL	Dilution Factor:	1.0

PNA COMPOUNDS

CAS Number		ug/L	
91-20-3	Naphthalene	2	U
91-57-6	2-Methylnaphthalene	2	U
90-12-0	1-Methylnaphthalene	2	U
208-96-8	Acenaphthylene	2	U
83-32-9	Acenaphthene	2	U
86-73-7	Fluorene	2	U
85-01-8	Phenanthrene	2	U
120-12-7	Anthracene	2	U
206-44-0	Fluoranthene	2	U
129-00-0	Pyrene	2	U
56-55-3	Benzo(a)anthracene	2	U
218-01-9	Chrysene	2	U
205-99-2	Benzo(b)fluoranthene	2	U
207-08-9	Benzo(k)fluoranthene	2	U
50-32-8	Benzo(a)pyrene	2	U
193-39-5	Indeno(1,2,3-cd)pyrene	2	U
53-70-3	Dibenzo(a,h)anthracene	2	U
191-24-2	Benzo(g,h,i)perylene	2	U
	Terphenyl-d14 - SS	70	%

U - Analyzed for but not detected.
B - Detected in QC blank.
J - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments:

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL	Concentration:	LOW	Date Extracted:	07/15/96
Lab Sample ID:	MB367005	Sample Matrix:	WATER	Date Analyzed:	07/25/96
Client Sample ID:	G9-MW01-1B	Volume Extracted:	1030mL	Dilution Factor:	1.0

PNA COMPOUNDS

CAS Number		ug/L	
91-20-3	Naphthalene	2	U
91-57-6	2-Methylnaphthalene	2	U
90-12-0	1-Methylnaphthalene	2	U
208-96-8	Acenaphthylene	2	U
83-32-9	Acenaphthene	2	U
86-73-7	Fluorene	2	U
85-01-8	Phenanthrene	2	U
120-12-7	Anthracene	2	U
206-44-0	Fluoranthene	2	U
129-00-0	Pyrene	2	U
56-55-3	Benzo(a)anthracene	2	U
218-01-9	Chrysene	2	U
205-99-2	Benzo(b)fluoranthene	2	U
207-08-9	Benzo(k)fluoranthene	2	U
50-32-8	Benzo(a)pyrene	2	U
193-39-5	Indeno(1,2,3-cd)pyrene	2	U
53-70-3	Dibenzo(a,h)anthracene	2	U
191-24-2	Benzo(g,h,i)perylene	2	U
	Terphenyl-d14 - SS	80	%

U - Analyzed for but not detected.
B - Detected in QC blank.
J - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments:

Form I

ORGANICS ANALYSIS DATA SHEET

Laboratory Name:	CH2M HILL	Concentration:	LOW	Date Extracted:	07/15/96
Lab Sample ID:	W07156B1	Sample Matrix:	WATER	Date Analyzed:	07/24/96
Client Sample ID:	NBLK06	Volume Extracted:	1000mL	Dilution Factor:	1.0

PNA COMPOUNDS

CAS Number		ug/L	
91-20-3	Naphthalene	2	U
91-57-6	2-Methylnaphthalene	2	U
90-12-0	1-Methylnaphthalene	2	U
208-96-8	Acenaphthylene	2	U
83-32-9	Acenaphthene	2	U
86-73-7	Fluorene	2	U
85-01-8	Phenanthrene	2	U
120-12-7	Anthracene	2	U
206-44-0	Fluoranthene	2	U
129-00-0	Pyrene	2	U
56-55-3	Benzo(a)anthracene	2	U
218-01-9	Chrysene	2	U
205-99-2	Benzo(b)fluoranthene	2	U
207-08-9	Benzo(k)fluoranthene	2	U
50-32-8	Benzo(a)pyrene	2	U
193-39-5	Indeno(1,2,3-cd)pyrene	2	U
53-70-3	Dibenzo(a,h)anthracene	2	U
191-24-2	Benzo(g,h,i)perylene	2	U
	Terphenyl-d14 - SS	83	%

U - Analyzed for but not detected.
B - Detected in QC blank.
J - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments:

Form I

Brown & Root Environmental
455 FAIRWAY DRIVE, SUITE 200
DEERFIELD BEACH, FLORIDA 33441
(305) 570-5885 (305) 570-5974 (FAX)

SITE MANAGER: G. Goode
PROJECT NAME: CTO 0008
BRE PROJECT NO.: 7113 CODE:
P.O. NO.:

SHIPPED TO: Quality Analytical, Montgomery Ala (LABORATORY NAME, CITY)
PAGE 1 OF 1

CHAIN OF CUSTODY RECORD

SAMPLED BY (PRINT): C. Burgin
SAMPLER SIGNATURE: [signature]

LABORATORY ANALYSIS

☒ STANDARD TAT ☐ RUSH
☐ 24 HR. ☐ 48 HR. ☐ 72 HR. ☐ 7 DAYS
RESULTS DUE DATE:

LAB NO.	DATE	TIME	SAMPLE IDENTIFICATION	COMP.	GRAB	MATRIX	601 (HCl)	602 (HCl)	504 (N/A)	239.2 (HNO3)	610 (N/A)	TRPH (H2SO4)				NUMBER OF CONTAINERS	COMMENTS
			G9-GW-MW01-001		—	GW	3	3	2	1	2	1				12	Samples ICED
			G9-GW-TW01-001		—	GW					2					2	
			G9-GW-TW02-001		—	GW					2					2	
			G9-GW-TW03-001		—	GW					2					2	
			G9-GW-MW01-001B			AW	3	3	2	1	2	1				12	
			Trip Blank														
			Temp Blank														

FOR LAB USE ONLY BS
MB 367
VERIFIED BS
HAZARDOUS Y N
DS ICE

TOTAL NUMBER OF CONTAINERS

	SEAL INTACT?	DATE / TIME		SEAL INTACT?	DATE / TIME
EMPTY BOTTLES RELINQUISHED BY (SIGNATURE) ① [signature]	(YES) NO N/A	DATE: 6/26/96 TIME: 0930	EMPTY BOTTLES RECEIVED BY (SIGNATURE) ② [signature]	(YES) NO N/A	DATE: 7-10-96 TIME: 1200
RELINQUISHED BY (SIGNATURE) ③ [signature]	~~YES~~ NO N/A	DATE: 7-12-96 TIME: 1830	RECEIVED BY (SIGNATURE) ④ Fed EX	YES NO N/A	DATE: TIME:
RELINQUISHED BY (SIGNATURE) ⑤	YES NO N/A	DATE: TIME:	RECEIVED BY (SIGNATURE) ⑥ David Shive	(YES) NO N/A	DATE: 7-13-96 TIME: 09:00A

SPECIAL INSTRUCTIONS:

LABORATORY REMARKS:

SAMPLE CONTAINERS PRECLEANED BY: ☐ BRE ☐ LABORATORY ☒ MANUFACTURER
METHOD OF SHIPMENT: Fed EX
BILL OF LADING NO.:

WHITE-FULLY EXECUTED COPY
YELLOW-RECEIVING LABORATORY COPY
PINK-SAMPLERS' COPY/QA COPY
GOLDENROD SITE MANAGERS' COPY

SAMPLING TEAM: C Burgin

RECEIVED FOR LABORATORY BY (SIGNATURE): Billy Scott
DATE: 7/13/96 TIME: 09:00

No. 0059

000415

Sample Receipt Exceptions Report

Batch Number: MB367 Origination date: 7/13/96

Client/Project: Brown & Root

SUMMARY OF EXCEPTION (check one if it applies)

√	Description of exception	Comments (write number of exception description and the impacted sample numbers)
	1. No custody seal as required by the project.	Sample I.D. G9-GW-TW01-001 had 1 broken container (1-1 liter for 610)
	2. No chain-of-custody provided.	
	3. Chain-of-custody provided but incomplete.	
✓	4. Samples broken or leaking on receipt.	
	5. Temperature of samples inappropriate for analysis requested.	
	6. Container inappropriate for analysis requested.	
	7. Inadequate sample volume for analysis requested.	
	8. Preservation inappropriate for analysis requested.	
	9. Samples received out of holding time for analysis requested.	
	10. Samples received more than 72 hours after sampling.	
	11. Discrepancies between chain-of-custody and container labels.	
	12. Other (describe on right)	

FRACTION(S) AFFECTED (specify which fraction was affected by the exceptions detailed above by writing the number of the exception next to it)

Unpreserved		Nutrients		Metals		Volatiles	
Cyanide		Extractables		Extractables	✓	Other (specify)	

ACTION TAKEN:

Originator: Billy Scott Supervisor:

Client was notified on: (DATE/TIME) 7/15 Client contact: Jerry Goode

Client's comments: Proceed w/ analysis

Client Services: Rb QA officer:

000416

QAL Montgomery

RECT_CAR.DOC (2/21/96)